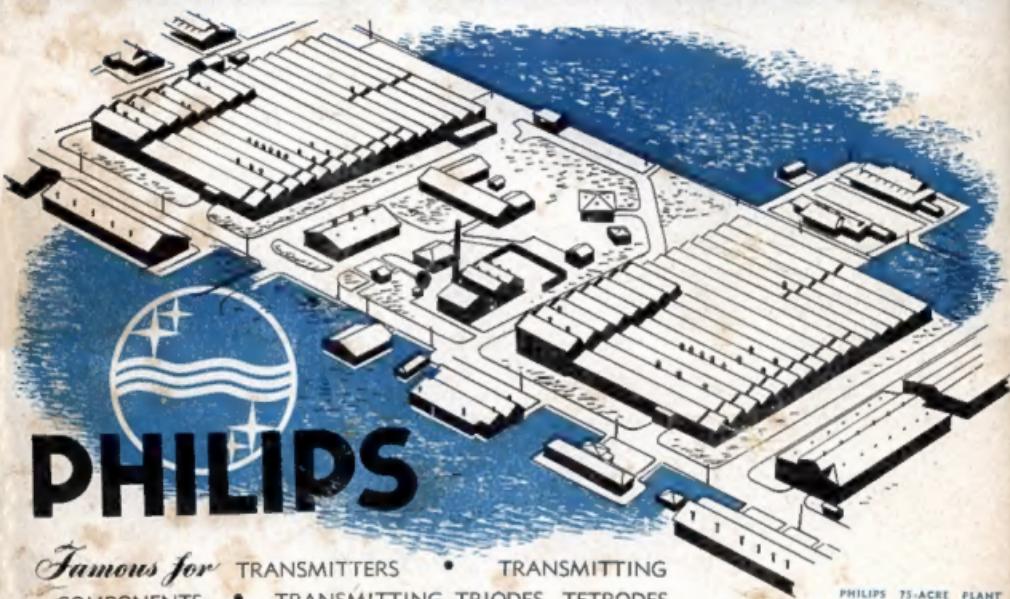


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JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

SEPTEMBER

1947



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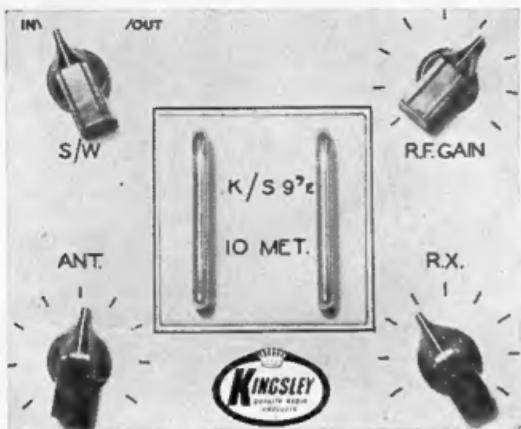


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AMATEUR RADIO

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EDITORIAL



Now that Frequency Modulation and Pulse Transmission is available to the Radio Amateur, it is important that those who intend to make use of these types of transmission, be cautious in their approach to the technical questions involved, before constructing equipment which may not be suitable for operation with other stations.

Whilst the technical problems associated with Frequency Modulation are fairly generally known, the technique of Pulse Transmission is not so simple nor are there many technical references available on the subject to facilitate experimental work in this field. It is important therefore that we determine standards of operation such as deviation ratios, audio frequency limits, frame sizes, pulse lengths, pulse synchronizing, peak powers and other important details, as become apparent to those who really study these fascinating fields of experimental activity.

Apart from the necessity for determining standards of operation, it is vital for the Radio Amateur to provide himself

with an accurate method of frequency measurement for the bands concerned, together with suitable test equipment, to ensure that his transmitting and receiving equipment is functioning correctly.

A great deal of time and effort, as well as considerable money, will be saved by those who think carefully, study diligently, and plan sensibly before commencing to use such methods of operation.

Your Federal Executive is seeking a definition of British and American standards of operation, and will endeavour to set out in next month's editorial, suitable standards of operation for Australian Radio Amateurs, which will be in line with the methods adopted in other countries.

In succeeding issues of Amateur Radio, we will also provide food for thought in regard to Frequency Modulation and Pulse Transmission, by the provision of technical articles on both subjects, together with descriptions of suitable test equipment for use with each method of operation.

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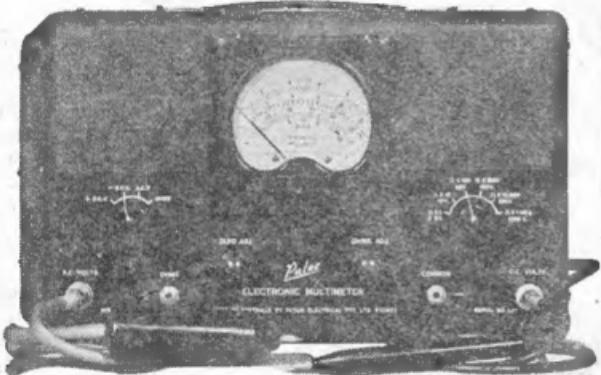
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CLEARING THE ETHER

Series II, Part XI

By G. GLOVER*, VK3AG

THE MODULATOR UNIT

The major requirements of the ideal modulator are:

(a) It must be capable of reproducing faithfully, in amplified form, all signals fed into its input terminals. Thus, in order to provide wide scope for experimentation the modulator unit, unlike the speech amplifier, should be designed to provide uniform response over the widest possible frequency band.

(b) Output impedance must be sufficiently flexible to allow unit to be coupled to modulated amplifiers having a wide range of input impedances, thereby facilitating experimentation.

(c) It should be possible to read cathode currents of individual tubes by means of switch and common meter.

(d) Unit must be capable of easy removal in order to facilitate its use either in rack or on bench as required.

in the region of nil distortion; however this is hardly economical or necessary unless special requirements have to be met.

There are several ways in which we can attack the problem of providing required modulating capacity, such as:

- (1) Using tubes large enough to cope with power requirements under Class A conditions.
- (2) Using smaller tubes in push-pull-parallel arrangement under Class A conditions.
- (3) Using small tubes in push-pull and driving same into Class AB₁, AB₂, or B region, in order to obtain required power.

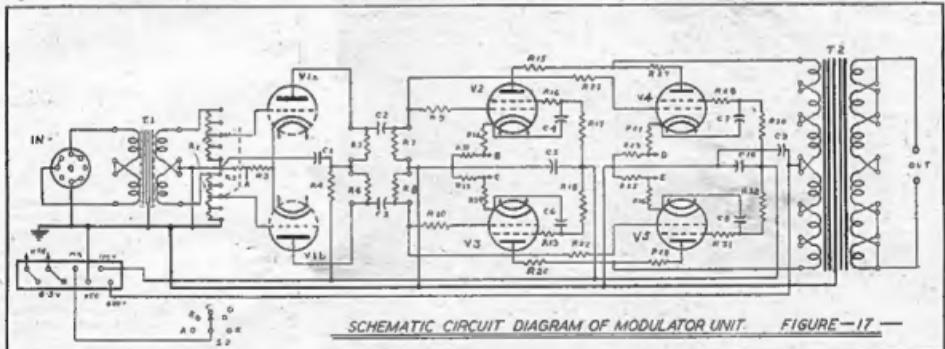
Output Impedance. — The best method of attacking the variable output impedance problem is by using a multi-ratio transformer, provided that the transformer is properly designed, and due allowance has been made for unbalanced d.c. flowing through secondary, loss of fidelity should be within permissible limits.

modulator unit, and the writer now proposes to outline one method of attacking the problem.

THE PRACTICAL MODULATOR UNIT

Figure 17 is schematic circuit diagram of modulator unit about which our discussion will be focused. In this case four 807 type tubes are employed in push-pull-parallel circuit capable of fully modulating 100 watt transmitter. Wasteful you think, may be insofar as tubes are concerned, but in view of the comparatively low cost of type 807 tubes and freedom from distortion, quite warranted. Naturally for 50 watt rig only one pair of 807s will be required. It is with a view to allowing for flexibility of power output rating, that the individual tubes are self stabilised and adequately isolated. Furthermore the circuit lends itself to easy changes, for instance, if so desired the resistance-capacity coupling network between stages may be replaced by transformer.

In practice it is questionable whether the use of beam tubes in modulator unit is warranted, because although the driving power required is much less than that required for triodes under normal circuit conditions, by the time adequate negative feed-back has been applied to counter inherent distortion of former, much of this gain disappears; still



SCHEMATIC CIRCUIT DIAGRAM OF MODULATOR UNIT.

FIGURE-17—

T1—600/100,000 ohm Input Transformer.

T2—50 or 100 watt Multi-Match Modulation Transformer.

V1—6SN7.

V2, 3, 4 and 5—807.

C1, 5, 10—8 mfd. Electrolytic Capacitors 525 v.w.

C2, 3—0.1 mfd. 600 v. tubular paper.

C4, 6, 7 and 8 see text.

C9—4 mfd. 1,000 v.w. paper.

R 1 and 2 see text.

R3—700 ohms, 1 watt, Carbon.

R4—10,000 ohms, 1 watt, Carbon.

R5, 6—50,000 ohms, 1 watt, Carbon.

R7, 8—0.1 Megohm, Carbon.

R9 to R32 see text.

Power Capabilities. — The modulator unit must have sufficient power handling capacity to provide 100% modulation of modulated amplifier before distortion exceeds permissible value. Naturally if we have a large pocket and are idealists we may construct our modulator with large enough power margin to operate it

By employing a number of pies in both primary and secondary, and connecting same either in parallel or series, it should be possible to incorporate the highest inductance possible for a given impedance ratio, while at the same time eliminating the necessity for unused pies.

Summary. — To date we have considered general requirements of the

807 seems to be the popular choice at present, so our story has been built around same.

The simple stabilisation circuit shown will not provide sufficient feed-back for wide-band operation, but does provide effective stabilisation of individual tubes over normal operating range; furthermore as previously mentioned one pair may be

removed without upsetting operation of circuit, apart from change in plate to plate impedance, which is naturally doubled when one set of tubes is removed.

Where wide band operation is required it is suggested that recourse be made to circuit employing pentode type tubes, such as 6SJ7G, in first stage and applying feedback to screen circuit thereof. The object being to allow more scope for frequency correction circuits.

If operation of output tubes in Class AB₁ is contemplated, for the purpose of increasing output, then two modifications must be borne in mind. Firstly, as fixed bias will be required the stabilisation circuit depicted will have to be replaced by type discussed in foregoing paragraph. Secondly, resistance-capacity interstage coupling will have to be replaced by transformer, and value of grid stopper resistors reduced. The necessity for change to transformer being brought about by the presence of grid current during the positive excursions of the driving voltage. Sounds awfully simple does it not? But, there's a catch in it! You've guessed it, the transformer is the nigger in the wood pile. Apart from the necessity of cross-connecting the feed-back circuit to cope with 180° phase reversal in the transformer, it is necessary to employ network to correct phase-shift at extremities of frequency range. The same story applies to Class B operation. All of which adds up to the fact that attacking the problem from a conservative angle pays dividends in simplicity and bug free operation.

Electrical Aspects of Unit.—By referring to figure 17 the reader will note that the first salient feature is the balanced step by step gain control. For simplicity sake the drawing depicts same as having only five contacts, in practice an eleven position, two pole, two section wafer switch is employed in conjunction with $\frac{1}{4}$ watt carbon resistors. Each step representing a change of 2 db, giving a total of 18 db variation prior to cut-off or infinity position, sufficient to cope with most needs. In fact if greater range is required it is desirable to insert small fixed attenuator pads in line between the speech amplifier and modulator. The value of 2 db quoted above is merely arbitrary as it may not be possible to select carbon resistors of exact value required, in which case the nearest value should be employed and the value of next resistor modified to maintain total resistance of "stick" at selected value. The experimenter who insists on a high degree of accuracy will find his time fully occupied selecting resistors of the correct value; however provided corresponding resistors in each "stick" have a value within 5% of each other, slight modifications in other directions will not be troublesome.

Table below gives exact and suggested values for 50,000 ohm "stick."

Resistor	Exact Value	Suggested Value
Top	10,285 ohms	10,000 ohms
2nd	8,165 "	8,500 "
3rd	6,490 "	6,500 "
4th	5,155 "	5,000 "
5th	4,095 "	4,000 "
6th	3,250 "	3,500 "
7th	2,585 "	2,500 "
8th	2,050 "	2,000 "
9th	1,630 "	2,000 "
Bot.	8,295 "	6,000 "

From the above table it is obvious that we have been able to rationalise values of required resistors with an error of less than 0.5 db. This fact is mentioned for the benefit of those experimenters who insist on regarding anything associated with the hump db as black magic.

Interstage Coupling is drawn in such a manner as to readily indicate how transformer connections would appear. When using transformer, R7 and R8 are replaced by resistors of the correct value required for the impedance of transformer chosen. Even when output tubes are operating in Class B or AB₁ condition resistors are required, in order to reflect finite loading during negative swing of driving voltage, otherwise parasitic oscillation is apt to start in the quiescent tube. In general a step up transformer will be required for Class A or AB₁ operation; whereas a step-down transformer will be required for Class AB or B operation. In the latter case the power handled by the driver tube is considerably greater; therefore low impedance triodes of the correct power rating operating in Class A are to be recommended for driver stage. Unless of course the user, through sheer cussedness, insists on trying cascaded Class B stages, with consequent risk of much splatter.

Grid Stopper Resistors R9, R10, R21 and R22.—These items are very important factors in the suppression of parasitic oscillation, and their value for Class A and AB₁ operation may be as high as 10,000 ohms, on the other hand for Class AB, and B operation value must be kept as low as stability will permit, under no circumstances should the value exceed 500 ohms.

Screen Stopper Resistors R16, R19, R29 and R31 are connected right at the tube socket to prevent parasitic oscillation in the screen-anode circuit and have a value of from 50 to 100 ohms.

Anode Stopper Resistors R15, R20, R27 and R28 should be incorporated in the anode lead right at the tube cap, in order to ensure maximum isolation of tubes. If any signs of splatter are noticed 100 pf, high voltage mica capacitors may be connected between tee of the two stopper resistors and ground in each case. The value of anode stopper re-

sisters should be the same as for screen stoppers.

Stabilisation Circuit.—Each tube has associated with it a stabilisation network consisting of 500 ohm cathode and screen resistors, and feedback capacitor of 0.5 mfd. (paper) value. The object being to feed back to cathode circuit sufficient out-of-phase energy from the screen circuit to stabilise the tube. For example the stabilisation circuit for V2 consists of R12, R17 and C4.

Output Transformer T2.—This item is drawn in the manner shown with a view to illustrating method normally employed for series or parallel connection of pi's.

Metering is accomplished with the aid of five position single section wafer switch and shunts in the cathode circuits of individual tubes. In order to save the expense of including meter in modulator panel the wiring is so arranged that while tube to be metered is selected by switch on panel the actual meter may be located on the common control panel, or wherever it may be desired to locate same. R2 has a value of 11 ohms and provides full scale deflection of 10 Ma. on 0.1 Ma. meter having internal resistance of 100 ohms. R11, R13, R23, R25 each have a value of 1.0 ohm thus giving full scale deflection of 100 Ma.

If considered desirable the switch may be extended to read screen and anode supply voltage, in a manner similar to that shown for "Speech Amplifier." Furthermore a blank position can then be provided for switch; thus eliminating any possibility of feed-back due to it being left in position where energy can be transferred between panels.

Mechanical Aspects of Unit.—In general the layout and design of unit may follow closely the design depicted for the Speech Amplifier in Part X of this series. It is suggested however that the plug and socket connections for the power on this unit deserve careful consideration. If the usual tube socket and base type fitting is to be employed care must be exercised to use say 6 pin assembly with contacts in parallel for heaters, and 4 pin assembly for h.t. and metering circuits. The type of fitting depicted in diagram has particularly robust contacts.

Final Summary.—In some instances the writer has diverged from the actual unit under discussion to comment on other aspects of operation, the object being to kill two birds with the one stone; hence it is hoped that such divergence has clarified, rather than clouded, the atmosphere. One point which has not been mentioned and that is the possibility of r.f. creeping into the unit. In such cases the application of 0.01 mfd. mica type capacitor in shunt with existing capacitor will do the trick.

AMATEUR TELEVISION

By G. S. B. HORROCKS*, VK6GS

High Definition Television is an accomplished fact in England and America. It is a matter for conjecture as to how long it will be before we have it in Australia. It appears to be the general opinion among Engineers that Australia should select the best system that either England or America can devise. With this, I heartily agree. However, there seems to be an all or nothing idea about the whole business which I think is regrettable.

HIGH AND LOW DEFINITION

Television overseas, started from very small beginnings, using the crudest of apparatus. Although a Low Definition Picture has very little entertainment value, from the broadcast listener's point of view, that should not deter the keen experimenter who is generally much more interested in the technical side. Also, by constructing Low Definition apparatus, it will be possible for the Ham to get some practical experience with Television, while waiting for the introduction of a High Definition Service.

Low Definition apparatus can be built by the Amateur, and, if certain parts were to be put on the market at a reasonable price, quite good pictures could be obtained. I have in mind transmitters of the mechanical optical type, which are fairly easy to construct. Fair definition is possible if the subject matter for transmission is restricted to either Film or Lantern Slides.

Television transmissions may be divided into two distinct types, namely, Direct Pickup and Telecine. Direct Pickup refers to the method of transmission, by which light reflected from the subject is directly converted into a television signal. A Telecine system requires the use of an intermediate film, upon which the scene or persons which have to be televised are first photographed by a movie camera, and the film after processing, is fed into the projector of the Telecine transmitter. The resulting video and sound signals are then broadcast in the same manner as those from a direct pickup transmitter.

Direct Pickup Transmissions are practically instantaneous, while there is a time lag with a Telecine Transmission. Standard cinematograph films may be broadcast by a Telecine Transmitter. If only still pictures have to be televised, lantern slides may be used in the place of film.

Direct Pickup Transmissions can be by either of two different methods; "Floodlight" and the so called "Flying Spot" system. With the first, the subject is illuminated by a powerful

flood light. Flood light transmission is invariably used with Electronic Pickup tubes, such as the Iconoscope. With Mechanical Transmitters, the flying spot (of light) method of scanning is generally used. In this case, the subject stands in semi-darkness. Some of the light, reflected from the flying spot which scans the whole field of view, line by line, is collected by the photo cells, which are arranged in such a manner, as to get a picture of suitable contrast.

Unfortunately, mechanical scanning is unsuitable for either high or medium definition, particularly when a large subject such as a living person or an extended scene has to be scanned.

In the case of low definition, where the picture is composed of less than, let us say, a hundred lines, mechanical transmitters can give good results and have the great virtue of cheapness.

With a mechanical transmitter it is possible to transmit, by direct pickup, a head and shoulders view with a definition of at least 60 lines. This may be done by using a Mirror Drum in conjunction with an oscil-

lating mirror for scanning. A car headlight globe may be used for a light source.

I am not at present interested in the radio transmission of television as in my case, the production of video has been a full time job, and it will be some considerable time before I am in a position to do so (Wireless Branch permitting).

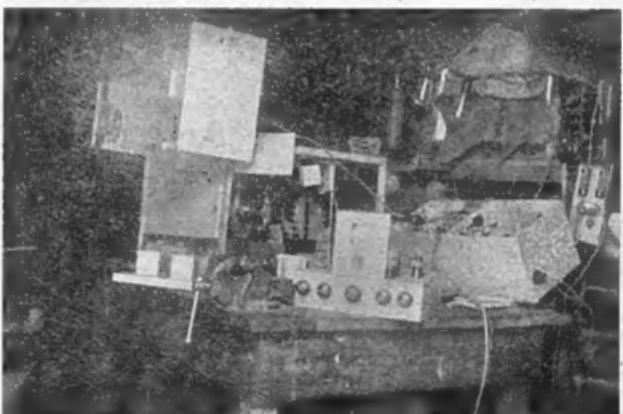
Television has, of necessity, to be broadcast on very high radio frequencies, this is due to the very large bandwidth required if there is to be no loss of detail.

A 60 line picture, if transmitted by radio, would need a bandwidth of approximately 50 Kcs., while a little over a 100 Kcs. would be needed for a 90 line picture. This is a fair slice of any Ham Band, though I expect it would be no more than that required for a super-regenerative receiver. High Definition would require a very large bandwidth; 6 Mcs. for the American 325 line standard. This should rule out High Definition Radio Transmission by Amateurs on the present allocation of frequencies.

RECORDED TELEVISION

It was around 1935-36 that I began to take a serious interest in television. The fact that I was unable to re-erect at my present address the 90' mast which I had at Narembeen, did much to make me abandon Amateur Radio for something different. I was subscribing to "Television and Short Wave World" and the articles in that excellent magazine also helped to switch my interest to Television. In 1936, I bought from a local firm a Recorded Television Record. This was recorded on an ordinary gramophone record, of a television broadcast on the old BBC 30 line standard.

To get a picture, it was necessary



Direct Pickup Mirror Drum Transmitter in foreground. Transmitter Scanner is laying on its side to show the works.

to run the record at a speed of 78 r.p.m. The output from the pickup and amplifier modulated a 5 watt neon lamp. In front of the neon lamp was placed a scanning disc. This scanning disc had 30 holes. These holes were arranged in the form of a spiral, with a spacing of 12° between the holes. This disc, when revolving at a speed of 750 r.p.m. and synchronised to the record, enabled the signals fed to the neon to be sorted out into their proper place in the picture, by only exposing the neon lamp, to that part of the picture which corresponded with the little bit of detail, that happened to be in the same part of the original subject matter scanned by the transmitter in the BBC studios, and then recorded on the record. This apparatus was designed to scan the picture in a vertical direction, and had a height to width ratio of 7 to 3. This record was synchronised to the scanning disc by carefully adjusting the speed of either the disc or the gramophone motor. With this record, and the very crudest of scanning apparatus and an amplifier designed for anything but television, I was able to get pictures which were at least recognisable as being those of men and women.

TELEVISION WITHOUT SYNCHRONISING

But the question which I kept on asking myself was "Would it be possible to have **Real Television** and not merely the recorded stuff?" There was only one way to find out, and that was to try.

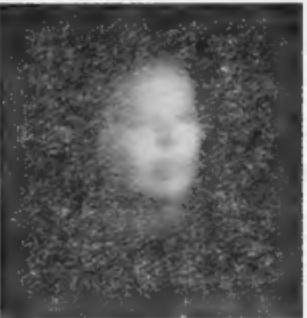
Most of the available literature on television was about how to receive Broadcast Pictures, and very little of it was written about the building of your own transmitter. The usual method was to use a Scanning Disc or a Mirror Drum for transmission, and a separate Disc, Mirror Drum or Cathode Ray Tube for reception. The Niphon Disc was the obvious choice for me as a beginner.

The difficulty of synchronising two separate scanning discs, had me worried, as I had no suitable driving motors. One method of overcoming this difficulty would have been to mount both discs on a common shaft, and to drive them by an electric motor at the speed of 750 revolutions per minute. I then thought of an even simpler method. Why not use the same disc for both transmission and reception? The reader may complain that this would defeat the main object of Television—the ability to see at a distance. However this experiment was intended to ascertain the possibility of generating a signal which would give a picture when resolved by suitable receiving apparatus. Also, as both the transmitter and receiver would in this case be mounted on the same table, it was obvious that nothing would be lost by using one disc for both purposes, and the elimination of syn-

chronising problems would do away with many possible causes of failure.

I therefore proceeded as follows: The receiving side of the scanning disc, with its neon lamp, was arranged in a manner similar to that used for recorded television. On the diametrically opposite side of the disc I mounted a light condenser and a projection-lens, both borrowed from a magic lantern. An electric light globe was used as a light source. With the lenses properly focused, and the disc revolving at 750 r.p.m. a scanning raster of 30 lines was visible on a screen, placed a few feet from the scanner. I found it necessary to add to the scanning disc an extra half circle of holes, as it is apparent that there is a displacement of half the picture width between any scanning strip, or line, in the transmitter and the corresponding strip exposed by the receiver.

For example, with a 30 line picture, No. 1 scanning aperture in the transmitter would be exposed at the same time as No. 16 aperture in the receiver. If an extra 15 holes are added to the disc, so as to continue the



Unretouched approximately full size of image on 3" Philips DG71-G cathode ray tube.

spiral of aperture for another half turn around the disc, it is possible to use holes from No. 1 to 30 inclusive for transmitting, and holes No. 16 to 45 inclusive, for receiving. A mask was used to cut off the unwanted apertures, as only one aperture may be exposed at a time.

Having arranged the dual purpose scanning disc as described, I connected the neon lamp (Osglim 5 watt) in place of the loudspeaker of a public address amplifier and plugged a photo cell into the microphone input socket. An inverted jam tin, with a hole cut out in its side to admit light, was placed over the photo cell as an electrostatic shield.

Everything was switched on and the photo cell tested for response, by flicking a weak light into it. The photo cell was placed about a foot from where the scanning raster of the

transmitter came to a focus, so as to pick up light reflected from the flying spot. Everything was ready for the first test. I placed my hand in the scanning beam from the transmitter, nothing happened! I tried a piece of white blotting paper, still no result. I then tried a shiny piece of metal.

At last! A bright spot was seen when viewing the neon through the revolving scanning disc. This bright spot in the receiver moved across the field of view in sympathy with any movement of the shiny piece of metal held in front of the transmitter.

My first attempt to use reflected light for transmission by direct pickup was not a success, so my next idea was to try silhouettes.

A handkerchief was placed where the scanning beam came to a focus, to act as a diffusing screen. (A ground glass screen, such as can be bought from a toy shop, would have been better.) The photo cell was placed behind the screen. A 4" diameter lens between the screen and photo cell increased the light pickup. This arrangement gave sufficient response to fully modulate the neon, i.e. between black and white (actually between red and black).

The pictures obtained with this set-up were anything but satisfactory owing to a phenomena which I will now describe as it should prove of interest to anyone who may contemplate the construction of any television apparatus.

If the fingers of my hand were held apart and placed just in front of the screen so as to be in the scanning beam, they appeared as four shadows in the receiver. However, on bringing my fingers together until they touched, of the four fingers formally visible in the receiver, only one remained. The position of the first finger would be marked by a sudden change from red to black. This blackness, however, quickly faded out, and merged into the background about where the second finger should appear.

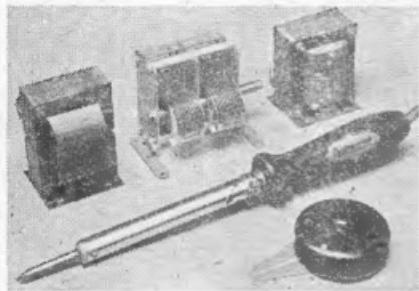
This made me realise that the low frequency response of the amplifier was quite inadequate. A specially constructed amplifier was need, with a level voltage output, down to below audio frequency.

SPECIAL AMPLIFIER

After searching through the back numbers of "Television" I found what I considered to be a suitable circuit, which I modified, so as to enable me to use battery valves and batteries, for at that time I had no a.c. power supply.

The amplifier had three stages of R.C. coupling, screened pentodes with 30,000 ohm anode resistances and large coupling condensers. The output of this amplifier was fed to a triode, with the neon connected between B+ and the triode plate. The high tension supply for this latter stage was taken from the d.c. mains,

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with a 45 volt B battery connected up in series to boost the voltage.

There was approximately a constant voltage drop across the neon of about 180 volts. The plate voltage was therefore equal to the supply voltage less 180 volts.

The only trouble I had with this amplifier was due to it being microphonic, owing to the use of battery valves. The least shock caused a series of parallel lines to appear in the receiver. This trouble was largely overcome by mounting the amplifier on a pile of newspapers.

The low frequency response was ample. In fact three full scanning lines thrown onto the diffusing screen gave enough response to hold the remaining twenty seven lines completely blacked out, if they were prevented from falling on the diffusing screen and photo electric cell.

I was able to get excellent shadow graphs of my hand and other objects of similar size. The definition appeared to be considerably better than what I obtained with the gramophone record as a source of television signal. I expect the results with recorded television would have been much better had I used this amplifier, but this was not tried.

LANTERN SLIDES

As mentioned previously, I was using the lenses out of a magic lantern. I also had a box of slides, so the next step was to use a lantern slide as the subject for transmission. The handkerchief screen was dis-

carded, and a slide mounted in its place. After bringing the scanning spot to a sharp focus on the slide, I was able to get a picture showing part of the slide.

It was after trying lantern slides that I realised that the 7 by 3 ratio was not the best for the average type of picture. Also, if a cathode ray tube were to be used for receiving, a large part of its screen would be wasted. Desiring a higher definition, a new scanning disc 18" in diameter was made out of a sheet of aluminium. The disc had two separate sets of scanning apertures, 60 in each spiral, making a total of 120 holes.

The first hole of the inner spiral of apertures being displaced half a turn around the disc from the first hole of the outer spiral. The inner spiral of apertures was used for transmission and the outer one for reception. This disc gave a definition of 60 lines, with a nearly square picture having $60 \times 60 = 3,600$ picture elements, compared with $70 \times 30 = 2,100$ elements of the old BBC 30 line standard.

Very much sharper pictures were obtained with this scanning disc, although the illumination on the receiving side was a little weak. To improve matter, I placed an Aluminium reflector behind the neon (Osram) lamp. I also placed a piece of ground glass between the lamp and the scanning disc so as to give an even background. A very thin smear of oil increased the amount of light passed by the ground glass. I also

removed the ballasting resistance from the base of the lamp, as there was sufficient internal resistance in the output valve to keep the current through the lamp to a safe value.

A SUITABLE STANDARD FOR THE BEGINNER

To anyone who would like to try this, the simplest possible television apparatus, I would recommend that they use a standard of 48 lines, being equal to 2,304 picture elements with a square picture. It is easier to divide a circle into 48, than it is to divide the same circle into 60 divisions. A 48 line picture would also be brighter than a 60 line picture.

With the transmitter and receiver placed on opposite sides of the scanning disc, there will be a displacement of 24 lines between what was transmitted and the picture as received.

Therefore, an extra 24 holes will be needed, making a total of 72 holes to be punched in a spiral of $1\frac{1}{2}$ turns. The last hole, being nearer the centre of the disc than the first, by an amount equal to $1\frac{1}{4}$ times the average distance between the holes, measured parallel to the circumference.

As only 48 holes will be used, it will be necessary to mask off the outer 24 holes on the transmitting side. Also the inner 24 holes on the receiving side of the disc.

As very little power is required to drive the disc at a speed of 750 r.p.m. care will be needed if a universal type of motor is used.

It is likewise necessary to eliminate

ate all interference from sparking brushes. A sparking commutator makes a pattern of either black or white spots on the receiver screen. Four, or six stages of amplification, will be needed.

This combined transmitter and receiver should be within the financial and technical resources of most Amateurs.

CATHODE RAY RECEPTION

The next step was to use a cathode ray tube for reception. The scanning disc being retained for transmission. In all cases where a separate scanner is used for receiving, some form of synchronising is essential. Although the a.c. mains may be used to synchronise mechanical receivers, something better will be needed to synchronise the cathode ray tube.

As there will be two time base circuits, one for the horizontal, and the other for vertical scanning, two separate synchronising signals will be needed, one for each time base circuit.

The line synchronising pulses are best generated by electro-optical means. The same method may be used to generate the frame synchronising pulse; although magnetic or other methods may be used if so desired.

The synchronising pulses may be sent to the receiver through a separate line. However, it is better to mix them with the picture signals, and then separate them at the receiver, according to normal practice.

If the synchronising signal modulates the c.r.t. in the black direction, which is negative, the line and picture frequency flybacks will be suppressed, giving a clearer picture. Also, as the synchronising pulses will be what is called, blacker than black, they will not appear on the screen, so therefore there will be no need to separate the synchronising pulses, from the picture signals which are fed to the grid of the c.r.t. It is, however, essential to remove the picture signal from the synchronising pulses before they are fed to the time base circuits. Some form of limiter may be used for this purpose. Also, the negative synchronising pulses have to be changed to positive pulses before they are able to trip the grids of the 884 tubes in the time base circuits. It is possible to use the limiter valve to change the phase of the synchronising pulses in addition to suppressing the picture signals. The output from the limiter is fed to two filter networks. A high pass filter feeds the line synchronising pulses to the other 884.

Apart from the difference in the value of certain components, the modulation, filter, and time base circuits of Low Definition Apparatus are similar to those used in High Definition gear.

I will now describe some of my own efforts with a cathode ray receiver. Early in 1938 I purchased a 913 1" diameter tube, a couple of

884s, and an extra photo electric cell.

The 913 and 884s were used in a double time base type of oscilloscope, provision being made to modulate the grid of the 913. Power supply was taken from the d.c. mains. I found it necessary to add an extra 150 volts to the h.t. supply as 220 volts d.c. was insufficient. A 6K7 was used as the synchronising phase inverter and picture signal suppressor. The 6K7 had zero bias and a one megohm resistor in series with the grid. This prevented the valve responding to positive signals, although the negative synchronising pulses for the time base were allowed to pass.

In the transmitter, the synchronising pulses were generated by optical means. Each scanning aperture as it passed clear of the mask allowed a spot of light to fall on to a small mirror which reflected the light spot into the synchronising photo cell. This took place at the beginning of each scanning line. The light spot from the scanning aperture in the disc, after moving clear of the small mirror, passed out through the projection lens, scanned the lantern slide or other object, and then into the picture P.E. cell.

The scanning aperture thus produced its own synchronising pulse, thereby allowing for any slight variation in the distance between any two apertures. The synchronising pulse occurred during the first 10% of a scanning line.

For the frame or picture repetition frequency pulse, a long narrow slit, spanning a distance equal to that between three apertures, uncovered the light source, and weakly illuminated the synchronising P.E. cell for a period of three lines, once in every revolution of the scanning disc.

The synchronising P.E. cell has to be suitably phased to the picture P.E. cell by feeding the output from it to the amplifier, an odd number of stages after the picture P.E. cell.

I had apparatus of this type working in November, 1938. Using lantern slides for transmission, I was able to get steady pictures, bright enough to photograph on the screen of the 913. The method of synchronising which I have described is both simple and effective.

Although I used a 913, I think that the 2" 902 would be a better tube to start with. The screen is larger and the operating voltages are much the same as for a 913. There is also very little difference in the price.

MIRROR DRUM TRANSMITTER

With a mirror drum in the transmitter it is possible to televise with a definition of 60 lines or more. A head and shoulders view of yourself or a friend, by means of direct pickup.

With a mirror drum, the constructional work is much more difficult. Considerable thought must likewise be given to the optical system. For when using either film or slides all the light which passes through the film can be utilised, but in the case

of the televising of opaque subjects only a fraction of the reflected light can be picked up by the photo cells. The amplifiers will therefore have to be run at maximum possible sensitivity. Both the photo cells and the early stages of the amplifier need very thorough screening. Any a.c. fields which may leak through the screening can completely spoil the picture. R.F. can be particularly troublesome, as a video amplifier has to cover the range from audio to radio frequencies.

I found that one of my amplifiers was particularly sensitive to the r.f. coming from 6TZ (frequency 1,340 Kcs), which is 20 miles from Ham.

I have listened to 6TZ for hours on a resistance capacity amplifier with only 4 inches of aerial, one stage of the amplifier was used as a detector. I was using battery power supply at the time, so I can truthfully say that the only inductances in the set were the loudspeaker windings.

Owing to these and other difficulties, it took me about four years before I was able to televise people by means of direct pickup.

HOW IT WAS DONE

A mirror drum with 24 mirrors was used for horizontal scanning. Vertical scanning was done by means of an oscillating mirror. A cam tilted the oscillating mirror once for every $2\frac{1}{2}$ turns of the mirror drum. I therefore had a standard of $2\frac{1}{2} \times 24 = 60$ lines. The cam operating the oscillating mirror was driven at 800 r.p.m., giving a picture repetition rate of 133 frames per second, which was fast enough to eliminate flicker with the type of c.r.t. I was using. The mirror drum, which was eight inches in diameter and mounted between two ball races, was driven at a speed of 2,000 r.p.m.

Both the mirror drum and the oscillating mirror cam were belt driven from a series type of electric fan motor. Please note the belt drive. Machine cut gears, as were frequently specified, were found to be unnecessary. With electro-optical generation of the synchronising signal, the image on the c.r.t. screen remains perfectly steady, even though there may be considerable changes in the speed of the mirror drum. An induction motor would have been much better, but I did not have one.

The light from the exploring scanning spot, after being reflected by the subject, my face for instance, nothing better looking being available, was collected by two P.E. cells, housed on either side of the transmitter. The output from these P.E. cells was amplified by a three stage r.c. amplifier, mixed with the synchronising signals, line and frame, and then further amplified in another three stage r.c. amplifier.

The output from these amplifiers was then fed through a short transmission line to the receiver. I never attempted to measure the frequency range of the video signal output of

this amplifier but from a careful inspection of the televised test pattern I estimate that the output should include frequencies between about 15 cycles per second and 25 Kcs.

The video output from these two amplifiers, six stages in all, was used to modulate the grid, and hence the brilliance of the scanning lines on the screen of the cathode ray tube.

I later replaced the 913 1" tube with a Philips DG71-G 3" tube. This gave a larger and brighter picture.

Negative synchronising was retained, a limiter being used to remove the video signal from the synchronising pulses which were further amplified before being fed to the 884 grids, in time bases. A total of 17 tubes were used, comprising three photo cells, two 884 gas triodes, one cathode ray tube, ten r.f. pentodes, and one rectifier.

About this time I obtained a rotary converter. It was now possible for me to use an a.c. power supply for the amplifier, c.r.t. and time bases. High tension for the c.r.t. and time base circuits was obtained from a pair of H.T.9 metal rectifiers, in a voltage double circuit, giving 800 volts d.c. on load.

The picture on the 3" tube was about 1½" square. The scanning lines were hardly noticeable at a distance of a little over 2' from the c.r.t. screen. The picture was both bright and steady enough to photograph. A time exposure of less than half a minute at F16 was sufficient.

The receiver was placed on a shelf, a little to one side of the transmitter so as to enable me to see a head and shoulders view of myself in the receiver, whenever I stood within range of the transmitter.

Some means of self televising, such as this was essential, as it didn't take very long for the other members of the family to get tired of posing for me!

When using the flying spot method of transmission, the subject is in semi-darkness, hence I had no difficulty in seeing my own likeness on the c.r.t. screen, if I turned my head sideways.

Although direct pickup work is very interesting and considerable fun can be had by inviting your friends to see what they look like when they are televised, I would recommend the beginner to start with the Nipho Disc and lantern slides, as a small machine shop is almost essential for the construction of a high speed mirror drum.

Such were my efforts up to the end of 1942. With the war over and some hope now of getting parts, I have returned to television experiments.

During the past 18 months I have been doing a lot of constructional work on a Telecine Transmitter using cinematograph film as subject matter for transmission. I expect to have this transmitter in operation before the end of 1947. Most of the remaining work which has to be done is in connection with the optical system.

The projector and sound head were built last year. The amplifiers are now useable, while the c.r.o. and time bases, used in 1942, are to be rebuilt. The motor which I built for driving the scanner can only handle a 7½" diameter disc, so I expect that I will have to build a more powerful motor.

After dealing with the inevitable gremlins, I hope to raise the definition up to about 90 lines or so. By incorporating voltage regulated power supplies, I should sidetrack quite a few of the feedback problems from which I suffered in the past.

I hope that it will not be very long now before we Amateurs can purchase electronic pickup tubes. This would enable us to get much better definition than is possible with the best of mirror drums or scanning discs.

At this stage I would like to thank "Amateur Radio" for the opportunity of narrating to you my experiments and experiences. While writing this article I have re-lived many moments of pleasure, of doubts and of difficulties and disappointments.

Being domiciled in the country has prevented me from contacting fellow Hams. However should any of you be in Harvey, I would, only be too pleased to meet you and, if not otherwise engaged, would enjoy a ragchew and if you so desire show you over the shack.

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FEDERAL NOTES

At the 17th Annual Convention held in Melbourne last Easter, the Federal Executive was directed to approach the International Amateur Radio Union with respect to the desirability of sub-dividing the high frequency amateur bands into phone and c.w. (Motion 29a) and request that prior notification of all world contests so that amateurs will be familiar with operational procedure before the contest starts (Motion 43). A reply from the Assistant Secretary I.A.R.U. is to hand and is as follows:

"Commenting upon your Motion 29a, as requested, we are obliged to say we feel certain that very little, if any, practical results could be obtained from an effort to sub-divide the high frequency amateur bands on an international basis as between phone and c.w. The principal reason is that such an effort has been made several times in the past, without making the slightest progress. For example, A.R.R.L. representatives at the recent Inter-American conventions have tried to effect such an agreement on the part of the various American countries, as a starter; but it turned out that there was no hope for such a plan, the principal difficulty in this case being that most of the South American nations are predominantly phone, and the amateur operating philosophies as between Canada and the United States on the one hand, and the rest of the Americas on the other, are simply too far apart.

"As a further complication of any effort which might be made now, it is probable that as a result of the Atlantic City conference now being held there will be a marked difference in overall band limits between various regions of the world.

"I think your Motion 43 is a good one, and we shall certainly include mention in the December Calendar of the desirability of giving advance publicity to international amateur contests. While I believe that it is true that post-war confusion has prevented the carrying out of good intentions, it certainly will do no harm to point out the thought."

NEW PUBLICATION

The Federal Executive is about to prepare a companion publication to the Postmaster General's Department Handbook. This publication will contain—

- (a) Guiding principles for the efficient operation of amateur stations
- (b) Standards of station design and installation covering basic principles, fire insurance requirements, safety standards, etc.
- (c) Reasons why all amateurs should be members of the Wireless Institute of Australia.

As you all will agree the compilation of such a comprehensive publication entails considerable thought and effort by Federal Executive. Suggestions and comments on the material which you think should be included under the above headings are urgently required. Please send your ideas to the Federal Secretary, Box 2611W, G.P.O., Melbourne. Give us your comments NOW, not when the booklet is published.

INTERSTATE CONTESTS

Motion 41 of the last Convention directed that Federal Executive arrange Interstate Contests on all bands annually to pre-emptuate the names of amateurs who lost their lives in the service of the country during the war of 1939-45 and that the trophies awarded carry the names of all such amateurs in accordance with Item 11 of the 1946 Convention.

In order that the list of names of those amateurs who paid the supreme sacrifice may be as full as possible we seek your earnest co-operation in furnishing any information in this connection to either your Divisional Secretary or the Federal Secretary.

In the July issue of "Amateur Radio" suggestions as to a suitable name for such an annual Interstate Contest were requested. To date no suggestions have been submitted, therefore Federal Executive has tentatively named the contest "The Remembrance Day Contest" which has been provisionally decided to take place during the week-end of 14th-15th August, 1948. The third

anniversary of the fall of Japan and the end of the war.

Whilst on the subject of contests, it has been decided to hold the following contests in addition to the VK International Contest:—

National Field Day—week-end January 24, 25 and 26, 1948.

Trans-Tasman—week-end May 15 and 16, 1948.

Details of the latter contest are now under consideration by the Contest Manager from whom we shall hear more on the subject in the near future.

ITEMS OF INTEREST

The Official Station of the Federal Council of the Wireless Institute of Australia is VK3WIA. It is anticipated that this station will be on the air in a few weeks time, so keep a lookout on the 7 Mc. band for the first broadcast.

The successful design for the W.A.S. 50 Mc. and Above Certificate was submitted by Malcolm McCartney, VK3KV.

New appointment: Sub-Editor of "Amateur Radio," Ron Hugo VK3EKW.

Supplies of membership badges have been forwarded to all Divisions and enquiries should be directed to your Divisional Secretary.

Arrangements have been finalised with the Postmaster General's Department for regular lists of cancellations, alterations and new licences issued. This information will be supplied to the Federal Executive and will be communicated to the Divisions and if possible through this column.

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SUCH NICE PEOPLE

By "GREMLIN."

Most times these days I just sit and listen. Reckon I know a lot of blokes much better than when I just swapped RSTs. Spiders are building around the old key and the rig is Amateur Radio, to say nothing of increasing the store of knowledge. One thing I have learned, VK is not inundated with poor signals and punks operating. Thanks gang!

— Heard on 7 Mc: "3RN dc 2DO—give my regards to 'Gremlin'." "2DO de 3RN—do you like him or don't you?" Thanks OM, herewith my "B," and trust it saves 3RN some worries as to delivery. Yep, you can take it. Nice spot Yass, know it well—is that any help? — My apologies to the Type 3 Mk. 2. I gather a few blokes have removed the click filter for cathode modulation, hence my remarks last month. — Just when my coloured beads were getting all bunged up with fluff, up pops my old copper Alf, 3VJ, 30 CQs, 8 signs, followed by 13 CQs and 4 signs!

Having any difficulty listening to the Sunday broadcasts of 2WI, 3WI and 5WI? Chaps who aren't interested could easily think of others and at least keep the channel clear during the broadcasts. Judging by the remarks addressed to the Divisional Stations, I'm not the only one with a grudge.

Methinks I whipped a bit of J and H business awhile back—you know, piratical stuff. 2100 hours 2/8/47 heard 3OZ with a very rough note and at 1000 10/8/47, 3FQ very chirpy. Neither signals anything like the usual from you chaps. May have been dinkum but I have my doubts, for I heard you both a couple of days later with the usual signal. — 3TS, your phone splashes badly on the low frequency side. Don't know what you are using but I've noticed screen modulated signals sometimes splash badly on one side. Those screen modulating an 813 may be well paid to have a looksee. Take a peep at the screen current first. Sweet, isn't it? Next consult somebody who knows—I don't. — 5AV's c.w. is pretty chirpy. I believe you are up Darwin way and I can't really blame anything feeling a little elated in departing that clime. — 5QV and 3IS also chirpy, plus 3AIR adding thumps for good measure.

Clicking along—2EO, 2AIB, 3AH, 3ADH, 3UN and—this is beginning to hurt—3RW's abrasive job. You win Reg, I've had it. Not another mention until I hear you T9X. That's a promise so PLEASE put me out of my misery. — 3CW is another with a rough note. — "Even his best friend" gang—7MY, 3GK and 2EU. The latter plus splash. Nothing

FEDERAL QSL BUREAU

RAY JONES, VK3RJ, MANAGER

Apropos of last month's par re pre-war QSLs now coming to hand, among a further batch just received is one from PA0UN relating to a contact with VK3OC on 14 Mc. on 13th September, 1936! In those days VK3OC was a power in the DX land. Maybe the receipt of this card will provide Ray with the necessary inspiration to restore his call sign and station to its pre-war glory

A card to the QSL Manager from CR7VAL bears the following supercription "I receive your orders in Mozambique." Can anyone offer an interpretation? From observations the QSL Manager formed the opinion that his "orders" were not even "received" in his own message

A listener report to hand from Germany states in excellent English, that the sender was a P.O.W. in Australia at Murchison, Victoria, for over five years. He solicits receipt of any spare literature about radio as "it is the only thing that really interests me." QTH is Hans Linke, Tischbeinstrasse 10, (24) Hamburg 33, British Zone, Germany. Can anyone help out please?

A sticker from Sweden announces that their Field Day Station SM3XA was set up at Ostersund, 1,400 feet above sea level in one of Sweden's choicest countryside spots, from 25th to 31st July. Goes on to say "If you care for a QSO with the famous Monster of the Great Lake in Jamtland, Sweden, call SM3XA. A sketch of the "Monster" depicts three half waves showing above the surface of the Great Lake

The new address of the Italian QSL Bureau is ARI-QSL Bureau, via S. Paolo, 10—Milano (Italy).

In a movement to regroup its services the R.E.F. have again changed the address of its QSL Bureau. The new address is Service QSL, 6 Rue du Pont de Lodi 6, Paris VI, France.

A change in the Bureau address for Fiji is also to hand. The new QSL Manager is VS2AS whose address is Mr. S. H. Mayne, Victoria Parade, Suva, Fiji. Licences in VR2 as at

personal mind you, just a little more care with the signal wanted. Now would that be considered diplomatic? Goody goody! — 4EJ and 2TE splash. 3ABJ just distorts. — 2AZ heavy background music 1940/18. — By the way 3TO, have heard you a few times and no sign of that parasitic. All's well. — — And so into a new era when f.m. is cricket—on some bands (is that any better Editor?). Won't tell you what I said last month, must have been naughty for honourable gent cut it out. Cheers.

14th July, 1947, are VR2AG, 2AJ, 2AK, 2AL, 2AM, 2AO, 2AP, 2AQ, 2AR, 2AS, 2AT, 2AU and 2UH. Most of the stations are situated either with the R.N.Z.A.F. at Laucala Bay, or with Aeradio at Nadi Airport. The retiring QSL Manager VR2UH/ZL2UH, D. A. Leslie, has returned to his ZL address for a spell.

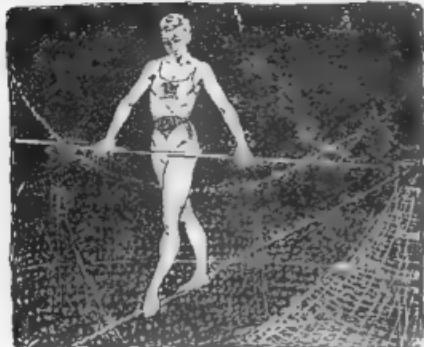
The Federal Secretary of the W.I.A. has requested publicity in these notes for the following motion (General Business No. 11) of the 1947 Federal Convention: "That it be a recommendation that all QSL cards be of standard postcard size and that the call of the addressee be written prominently on the back." It should be self-evident that failure to comply, results in damage to oversize cards and to delay in handling.

Glad to hear from Russ (VK3XK) once again. Russ, who does servicing at lighthouses, expects to be at Cape Wickham King Island for a couple of weeks during September—October. Will probably take along the Type 3 Mark 2 which he used with success while at Cape Schanck, Victoria, recently. Whilst at the latter lighthouse Russ renewed his acquaintance with 3.5 Mc. and found it a pleasant change from his DX activities of 14 and 28 Mc. from his home address. Russ received one card at Cape Schanck addressed VK3XK, Port Aible, Cape Schanck, the sender having preserved the nautical atmosphere in the address. Russ further mentions that he needs verifications from only six American States to qualify for W.A.S. Don't want to discourage you Russ but writer has needed the same number since 1939. Suggest you contact Alan Brown (VK3CK), he found the knack of wringing out a card from the rarer States. Ask him how he finally got Delaware.

The Victorian QSL Manager, Graham Roper, VK3ZB, 26 Lucas Street, Caulfield, S.E.8, Victoria, again sends out an SOS for Victorian metropolitan stations to collect their cards. Graham says his sofa is only 5 feet long and cannot accommodate many more cards. Do the right thing chaps and help him to help you. QSL activity has reached an all time high and cards for VK stations are being handled at the Federal Bureau at the rate of 8,000 monthly. Each month sees the record being broken. Where will it all end?

The writer has made arrangements for VK9GW (ex-VK3ABW) to act as QSL Manager for VK9. His address is Mr. G. A. Warner, care O.T.C., Port Moresby.

KEEP YOUR BALANCE



A skilful tight-rope performer was asked how he managed to succeed in his career. He replied: "I take one step at a time and keep my balance."

To keep one's balance at the present time is sound advice, especially one's Savings Bank balance, for with the partial lifting of wartime controls there comes the temptation to spend carelessly on fads, fancies, and luxuries.

Don't buy on the impulse unnecessary articles that attract you: keep your balance.

Think carefully before you spend

THE STATE SAVINGS BANK OF VICTORIA

"SAVE AT THIS BANK"

FIFTY AND UP

The old 50 Mc. band lived up to its reputation again by opening on the following dates and times.

Sunday, 27/7/47, 1330-1330.— Queensland to Victoria contacts were remarkably stable during the whole session. Stations making contacts included VK4ES, 4HR, 4RY, 4AW, 4TR, 4ZU, 4RT, 4KB, and 4CT in Brisbane, and 4SN, 4BJ, 4PG, and 4CU in that country. Victorian stations were 3HT (worked 13), 3BD (worked 7), 3EH, 3BW, 3CP, 3YP, 3YS, 3GG, and 3BQ.

On the very same day at 1900-1915 hours the band opened for first time since last year for contacts between VK2 and VK5 when VK5QR heard VK2OC calling "CQ Six" at 1850 hours, S9 with no QSB. He was unable to call as the 50 Mc. rig was tuned on 7 Mc. (3YS note). A hurried retuning and a CQ DX call brought no response, but VK5CU heard the call and tuning the band heard VK2Y? (surely not VK2Y—Editor) calling CQ. VK5CU's CQ DX netted VK2FO who came back twice but unfortunately faded as he was about to give the signal report. Congratulations on the contact Cliff. Several VK2 stations were heard calling VK5CU, all at excellent strength.

VK5QR heard and called VK2NP R5 S8, VK2OC R5 S9, VK2WJ R5

S9, and also heard a VK2 calling on m.c.w. near 52 Mc. No contact was made however! It appears that the rig was running self-excited most of the time, due to the frenzied QSY from 7 Mc.

VK5GF made a belated appearance but the fade out had started. Max had been working on 28 Mc. and noticed the extremely short skip (VK2-VK3) and listened on 50 Mc. until 1815 hours but heard nothing.

VK7XL heard VK4CU, 4TR, and 4ZU calling and working VK3s at around 1730. Signals were fading S9 to S1, and 7XL called them to no avail. His converter used 9003 r.f., 9003 mixer and 9002 oscillator in conjunction with a three element beam.

On Saturday, 2/8/47, VK3HT and 3KX worked 4KR and 4ZU in the afternoon. VK3ZL had a part QSO.

Sunday, 3/8/47 at 1500 hours, VK5GL heard 4PG working 3HX (VK3HX, being Editor of this Magazine, begs to be excused the honor as he has not yet made an appearance on this band—Editor) S4 on peaks, and same day, 1947 hours 5CU heard 3HZ S6 calling 5GL.

NEW SOUTH WALES

N.S.W. V.H.F. Section is now well under way after four successful meetings with an average attendance of about 45. The 50 Mc. boys are looking forward to the expected DX.

Some multi-element horizontal beams are under construction, but the general idea here seems to be to use vertical for cross town rag-chewing.

VICTORIA

VK3ZL at Ballarat, provides some interesting reports of Melbourne stations. 3EH gets through the best. 3IG, with a plain horizontal dipole 50 feet high, gets through better than 3HK, 3HT, 3YS, etc., with their four element beams 23 feet high. 3HZ, at Warrigul hears 3ZL but no contact so far. 3GM at Ballarat gets through occasionally. Pleased to hear that ex-3IZ from Red Cliffs will be on soon. 3ZL hears 3KZ (Didn't know the BC stations were on 50 Mc.—Ed.). New stations 3IG, 3KX, 3AMP.

3BQ and 3GM, down from Ballarat, conducted some Rx tests using a portable low power oscillator placed some distance from Rx aerial. From the results, 3GM thinks Melbourne receivers are better than Ballarat's. VK3BD has f.m. receiver OK and his transmitter almost ready for f.m. also.

QUEENSLAND

The 50 Mc. fraternity in Brisbane recently had the pleasure of a visit from 3MJ and we were all interested to hear Dave's account of doings down under and his views and experiences with horizontally polarised beams, and the great improvements noticed, particularly in reception.

WESTERN AUSTRALIA

The usual gang still active from home stations but the week-end weather lately has been too unpleasant for portable work. 6SA and 6LW both waiting to try the Northam Rottnest route.

No new signals yet on the band but several of the country boys are very busy building. Hope to hear very soon from Geraldton and Albany that they are ready for tests.

Very successful tests have already been carried out with fm. on this band using reactance modulations of an e.c.o. Earlier tests with xtal, although f.b. on 27 Mc. did not work out on this band owing to the poorer selectivity of the higher i.f. channels used in the 50 Mc. receivers. Up to the time of writing the fm. transmissions have been carried out by 6LW with 6FC, 6GB and 6SA using detuned a.m. receivers, but several of the boys expect to have ratio-detectors ready soon.

TASMANIA

7XL and 7AB have a reliable circuit between Devonport and Burnie on 50 Mc. now. 7LZ and 7BQ in Launceston, are preparing for a flutter in the near future.

168 Mc. ACTIVITIES IN VK

Approximately 20 stations are now active on 168 Mc. in Sydney. The majority are using superhet receivers. At least three stations are using xtal control. 2KI recently went portable to Bowral and was able to have several successful contacts with 2FK over 60 miles. 2AGL has been active with a "Handy Talkie" as well as the main rig on 168 Mc. In co-operation with 2AHG and 2FW he was able to demonstrate to the last V.H.F. meeting that the little job really works! Best DX to date is 10 miles.

Those active in VK3 are 3ACM, 3RR, 3EM, 3MB, 3MN, 3LS, 3MD, 3ARK, 3NB and 3KR will be on soon. Not many beams in use, only 3MB and 3ACM using them. Vertical dipoles and ground planes for the rest. 3NB is using a non-radiating super regen (cheers). Unintentional fm. (via mod. osc.) is used extensively. 3WQ has nice 168 Rx and almost ready, it has 2 r.f. stages, mixer, and osc. all acorns, and six i.f. (1852) on 30 Mc. Very neat.

The efforts of 4FB and 4XG have at last yielded results, and it seems as though the band is about to receive additional occupants. 4TR and 4HR have been active and 4KB, 4ES, 4ZU and others are on the way up.

VK5GB makes a good job of re-transmitting W.I.A. news on V.H.F., both 50 and 168 Mc. But don't be a piker, Geo, give the "ergs" a chance, push your V.H.F. antennae to the top of the stick. —— 5KZ indulges in "pirate-like" practices. Hides his antenna behind the garden fence. Doesn't cover as much territory as of yore. —— 5RQ is a staunch club member, but his signals are not

CORRESPONDENCE

Shepparton

The Editor, "A.R."

The decision to cancel the probationary period on c.w. will, we are sure, be regretted by all Amateurs who are interested in brass pounding, and especially the old-timers who were brought up on the belief that a Ham wasn't a Ham until he was a proficient c.w. operator, even though it was often a long and painful process. There is the undeniable fact that in times of emergency an efficient c.w. operator may be the means of saving life or providing communication where it is either impossible or undesirable to use telephony. The recent war and the work done by the R.A.A.F. Wireless Reserve members, especially in the early stages, is one instance. Going further back many will remember the traffic handled by Hams between Hobart and Melbourne for the P.M.G.'s Department during the 1928 Tasmanian floods. And there are other cases too.

We feel that the Institute should take a more active part in encouraging the use of c.w., as there is an increasing tendency among new licencees to take the line of least

so robust. How's about it Claude? JD would like to QSO. He's still after that "W.A.S." —— 5NG still a keen mobile man. Believed to have something good on the bench. We'll be listening out! —— 5GL got away to a nice start but faltered at the furlong post. Building a superhet —— 5RT likes wet weather, improves the impedance matching round the shack! —— 5QR, congrats are the order of the day. Winner of the I.R.E. award. Still, what about getting off those laurels and making yourself heard on 168 Mc. 5RV works on the principle that low angle radiation is best obtained with the antenna half wave above an effective earth. Also believes in short transmission lines. The transmitter nests in the eaves! —— 5JD QRL with various antennae. Latest addition being a GPA. 5JD has an 815 going well. —— 5GF is also on this band.

VK6LW still waiting for somebody to join him—hearing his own signal over a distance of a mile does not afford him much pleasure.

Activities in VK7 on this band are unknown. If anyone is active please drop a few lines and let the gang know what is happening.

1300 MEGACYCLES

In New South Wales VK2NP is experimenting with broad band dipole for 1300 Mc. How about sending along some more dope, OM?

VK3VM (Ted Marks) is using a cavity resonator and a 2C40 (?). Ted is a surgeon dentist so we can understand why he uses a CAVITY resonator. Some more dope from you would be appreciated also Ted.

resistance and go straight on phone, which means the loss of another potential c.w. operator. At that early stage constant practice is the only way to improve, and once it is neglected it is seldom one feels like starting all over again. To this end the Institute could well take a lesson from the A.R.R.L. who are always out to encourage the use of c.w., with code practice transmissions, official bulletins sent in c.w., etc. The A.R.R.L. HQ station operating times daily are 44 hours c.w. and 14 hours phone, whereas we have never heard of our official station being on anything but phone. And we would suggest that consideration be given to the revival of the "Five Point" Relay Contests, which were at least more a test of an operator's ability than a day contest.

And, if it is not compulsory for a station to come on the air on c.w. now, what is the point in having to pass a code test as part of the examination? Can it be that the Department realise that a man who knows the code may be of some practical use some day—if he sticks to it?

Yours, etc.

C. HARRISON, VK3CN.

A. H. BUCK, VK3TM.

[VK3WI has conducted code practice transmissions. Federal Executive advise that the abolition of the regulation referred to was secured by the Institute in pursuance of its policy of reducing restrictive regulations to a minimum. Means of encouraging a greater use of c.w. is being examined by Federal Executive at the present time.—Editor.]

INSTITUTE BLOCKS

The Council of the Victorian Division of the W.I.A. has procured blocks of the Institute badge for use by its members on their stationery.



Two sizes as shown herewith are available free of charge upon application to the Secretary. Country members are requested to send their enquiries to Box 2811W, G.P.O., Melbourne.

ISLE OF MAN—GD

As a result of representations made to the G.P.O. by the R.S.G.B. on behalf of radio amateurs resident in the Isle of Man, the separate prefix GD has been allocated to all Isle of Man amateur stations who are no longer authorised to use G.

Isle of Man will henceforth be regarded as a separate Dominion Zone for B.E.R.T.A. and the new Empire DX Certificate. The A.R.R.L. have also agreed to its recognition as a separate country for DX C.C.



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• "Your claims are fully justified, the performance being excellent in every way. The outstanding feature is of course the Wonderful signal to noise ratio, and this, together with its excellent sensitivity, should satisfy the most confirmed critic."

On the 10 metre band I have compared received signals using the "640" and a 3 element beam with the same received signal at other stations using 3 element beam and time again. Hence the details in sending my report, and I have proved to my own satisfaction that the "640" has this advantage, taking an average over a large number of contacts, which practical report you will probably appreciate more than most laboratory reports. The excellent signal to noise ratio of the "640" has enabled me to carry through a QSO which, with my previous Station receiver, would not have been completed, under similar conditions. I have spent quite a lot of time on these comparative checks, and have proved these points conclusively."

The noise limiter is extremely effective, as is the crystal filter. In conclusion, I state that the "640" is a really fine job, which fills a long felt want for a standard British Amateur Communications Receiver, which will have my hearty support, and I hope that this is the first of a new series of Amateur instruments by Eddystone.

I might add that the "640" is now my own station receiver, and I'm rather fussy."

• "It proves it to be a most remarkable receiver and you are to be congratulated on producing such an outstanding 'Ham' set, and we wish you every success in this market."

• "Having fully tested the model "640", it fully comes up to the standards required for a Communications receiver of this nature, especially on the 'Ham' bands we were able to separate stations working almost on top of each other.

The signal to noise ratio is extremely good. We have great hopes for this set during the coming season. You are to be warmly congratulated on the production of a very fine model."

• "The "640" was tried out over the week-end by our Mr. W. and J. B., an ex-Merchant Navy Radio Officer of some ten years operational experience. The latter was delighted with the sharp and clean Cut, noise obtained by this receiver, and the compact, general sensitivity, selectivity and ease of control with two highly rated USA RX. "640" compared more than favourably with either model. Noise level for a given signal in fact was much lower in either case and the measured carriers of very weak signals were in several instances slightly superior on the "640". The appearance is really a fine job and altogether we feel that if this set were to be put on the USA market it would receive the enthusiasm who still believe we in Britain can produce the goods without a lot of unnecessary trimmings and yet efficient and exacting standards."

These are extracts from just a few of the numerous congratulatory letters received by the makers of the "640".

EDDYSTONE AMATEUR BANDS COMMUNICATIONS RECEIVER MODEL 640

MAIN TECHNICAL FEATURES

1. Receiver has been designed primarily for Amateur Communication purposes, tuning range from 31 Mc/s to 1.7 Mc/s.
2. Designed to operate from Standard AC Mains with inputs of 110 volts 200/240 volts, 40/60 cycles as well as from a 6 volt battery by the use of a separate vibrator unit.
3. Inclusive all valves, the "640" is a 9-valve job with one tuned RF stage, FC, two IF stages, detector-AVC-1st audio, 2nd audio output, noise limiter, BFO and rectifier. The valves used, in that order are EF39, 6K8, EF39, EF39, 6Q7, 6V6, EB34, EF39, and 6X5. These are all international octal based on the Mullard or Brimar versions and are therefore easily replaceable.
4. INPUT IMPEDANCE—400 ohms
5. TUNING RANGE—
 - (1) 31 to 12.5 Mc/s.
 - (2) 12.5 to 5 Mc/s.
 - (3) 5 to 1.7 Mc/s.
6. TUNING. An electrical band-spread arrangement is used for this purpose. Fly-wheel control is utilised on the band-spread condenser drive. The scale is clearly marked with all amateur bands, and is so arranged to enable accurate re-setting to a spot frequency.
7. I.F. FREQUENCY—1600 Kc/s.
8. CRYSTAL FILTER is vacuum mounted to provide a high degree of stability. Phasing control and "in/out" switch are brought out to the front panel.
9. Sensitivity is better than 2 microvolts input, for 50 milliwatts output, at all frequencies.
10. OUTPUT. Audio frequency output exceeds 3.5 watts.
11. "S" METER. A socket is provided for an external "S" Meter.

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DIVISIONAL NOTES

NEW SOUTH WALES

Secretary: Peter H. Adams, VK2JX
Box 1134 G.P.O., Sydney.
Meeting Place: Science House, Gloucester and Essex Streets.
Meeting Night: Fourth Friday of each month.

The last meeting of the N.S.W. Division was held at Science House on Friday, 22nd August, and the attendance was, as usual, quite large.

Following the general business, the evening was devoted to the holding of a "Quiz," which proved very popular and some very knotting problems were thrown into the ring for solution. The opinion of members present seemed to be that more of this sort of thing would be welcomed.

The Division held its 7th Annual Dinner on the 7th August and quite a large roll up of members attended. Mr. Armstrong was present to represent the P.M.G.'s. Department, and representatives of the various Radio Clubs in the metropolitan area attended. It was most gratifying to see some of the boys from the country districts present and everyone voted the evening a success. The number of personal QSOs which were held during and after the dinner proved that the average Ham can talk just as well without the aid of a key or microphone, as with one.

The positions of Zone Officer for the South Coast and Newcastle Zones have been accepted by VK2ANN and VK2FP respectively.

An interim or progress report submitted to the last Council meeting indicates that the A.O.C.P. classes being run by this Division are proving very popular and assisting to swell the ranks in this State.

Permission has now been granted to make use of the 50 Mc. band for W.L.A. weekly broadcasts and these will take place until further notice on Sunday evenings, thus supplementing the transmissions on 7 Mc.

Membership of the Division is increasing at the rate of approximately 8 or 10 per month and usually the attendance at general meetings takes the capacity of the hall.

There is not much personal gossip this time chaps, but unless you let us have it we can't write it, so how about a ring or a note sometimes. Don't forget that the competition for the best technical article for the "Mag" is still running.

NEWCASTLE AND DISTRICT ZONE

2BZ very pleased with results on 14 and 28 Mc., using twin beams on top of 36 foot telephone pole. — 2AHA working Europe on 14 Mc., sometimes on 28 Mc. Over 100 countries up. — 2PQ, a newcomer on phone, operates on 28, 14, 7 Mc. Gets good reports from U.S., Burma, etc. — 2AFS getting out in all directions with a two ele-

ment beam; over 36 countries with only 36 watts. — 2AE heard tuning up with an 813. Has some feedback problems, and is about ready to chase the DX. — 2CS about to go on with a temporary rig and has a f.b. receiver which is more than half the battle. — 2WU still on c.w. with that copy-book fist. — 2AGD has the 28 Mc. rig peaking and works into ZS and G with good reports. — 2AGY on 14 and 7 Mc. phone. — 2AMM has a change of QTH and reported on active list again. — 2XQ is leaving old QTH and going bush. Guess we will see him at the next Wyong field day though. — 2FP still on 28 Mc. and has new rx with two EF50 for r.f. 74 countries on 28 Mc. phone and awaits VR8AA. — 2CI has nice quality phone on 14 Mc. but in trouble grinding xtal for the 14 Mc. band.

COALFIELDS ZONE

2KZ as usual exclusively on 28 Mc., not as active as usual, illness in family. — 2XT mainly on 7 Mc. Visited Sydney with 2PZ and 2MK for the W.L.A. Dinner. — 2MK is on 28 Mc. phone only. — 2PZ week-end 7 Mc. phone supporter. — 2DG and 2TY trying vertical antennae, using down pipe, not heard here. — 2ADT nearing his hundred countries post-war, 97 up. Using 14 Mc. more these days with bursts on 7 Mc. — 2YL 28, 14 and 7 Mc. worked recently, 118 countries post-war; conditions improving on 14 and 28 Mc.

WESTERN ZONE

2IE now on permanently with v.f.o. driving p.p. 807s r.f. and mod, nice rack and panel job. — 2BT uses parallel 807s with p.p. 807s mod, xtal or with a FS6 as a v.f.o. — 2ACT gone a.c. using 110 volt alternator driven by petrol motor. A great improvement on batteries. — 2II, the old inimitable, has a panoramic adaptor, sees them as well as hearing them. The rotary went in a gale but now re-erected and works even better. — 2EL just had his phone going nicely on 7 Mc. and has moved to Earlwood, but gear still packed away. — 2NS says he has been busy re-building, but we suspect he has been scaring the boys at the waterworks?

2JC has nice phone on 3.5 Mc. — 2ACU has new antenna; has also been heard working QRP at Coonamble. — 2RV, the only one heard from Broken Hill, believe most of the others are on 14 Mc. — 2HZ building new receiver, will be nice to look at, even if it doesn't work. — 2LZ still exclusive to the very highs. — 2WH QRL polo, still finds a little time to work DX on 14 Mc. Almost W.A.C. in one hour, only wanted Africa. — 2TG still on 14 Mc. c.w., has 103 countries up. — 2PA seems to go in for marathon QSOs. Had one with 3VV for 2½

hours, then a three way with DX in two other Continents. Pete was either taking advantage of the YF's absence or wants to qualify for the Night Owls' Club.

SOUTH COAST AND THE TABLELANDS

New Zone Officer for this Zone includes that part of the State south of a line drawn across below Botany Bay and east of a line drawn north and south through Cootamundra. Main towns include Yass, Goulburn, Queanbeyan, Canberra, Tumut, Wollongong. Please

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forward your news to 2ANN, Box 66, Bega. —— 2ADI who did good work with a few watts from a vibrator is inactive, pending a.c. being connected, only blessing so far is a super power leak at his door. —— 2ANN is getting gear together for a grand re-build, rhombes and all.

SOUTHERN ZONE

2JA expects to be active soon. —— 2QD getting discharged from the R.A.A.F. and should be heard again. —— 2EU found lost audio, modulates carrier better now, but still some feedback. —— 2APW active on 7 Mc. Building frequency meter. —— 2VK re-built xmitter and is active again. —— 2ANQ had better burn those skin and exercise the ether. —— 2QJ finished receiver consisting of 6AC7 r.f., 8K8, 6C6 h.f.o., 6SH7 i.f., 6C8 b.f.o., 76, 42, intends trying 6AK5 h.f.o. —— 2VS now at 2CA Canberra and getting shocks in rx from local broadcast station. Solution Vic. move. —— 2EH building v.f.o. —— 2FJ left Wagga to take commercial class. —— 2NE, new Ham, Mick Cooper is commercial operator at Wagga droome. —— 2BW very active fixing up haywire. —— 2TH active on 7, 14 and 28 Mc. and listens on 3.5 Mc. —— 2AID active on 7 and 14 Mc., re-building sections of rig.

VICTORIA

Secretary: A. B. D. Evans, VK3VQ, Box 2811 W G.P.O., Melbourne. Meeting Night: First Wednesday of each month. Meeting Place: Radio School, Melbourne Technical College.

"FOOD FOR R.S.G.B." APPEAL

It is appropriate that after four months of existence, the Committee should look at the Appeal in retrospect and briefly recapitulate.

First and foremost, the object of the Appeal was to provide a steady flow of food parcels to the R.S.G.B. for distribution among its many members. To be truly representative of the feelings of VK3 Amateurs, the Committee wished that every licensed Amateur in Victoria would donate at least a small sum to the Fund. With the appointment of Country Zone Organisers, it was hoped to make this idea more workable.

Secondly, the Committee, in its operations, has achieved many of its original objectives. Food parcels have been sent at the rate of 20 per month, the Appeal is officially registered as a Patriotic Fund and the Committee have permission to conduct raffles anywhere in Victoria until June, 1948.

The greatest disappointment to the Committee has been the fact that only relatively few country Amateurs are represented in the contributions so far made. Special mention must be made to the North Eastern Zone, under the capable organising of Howard Wohlers (VK3YV), who are doing an excellent job.

Statistics show that the contributions per head for the four months

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has been.—N.E. Zone, 15/-; Metrop-
olitan, 8/-; S.W. Zone, 3/6.

While these figures are good, the Committee feel that they can be bettered without hardship to anyone, and ask that in future, every Amateur endeavours to at least double his present subscriptions to the Fund.

At the Annual General Meeting on the 6th August, donations from the box collection were £9/0/7. The raffle of the SBPI and a split-stator condenser was won by VK3MM and yielded the sum of £10/9/-. Total receipts to the Fund are now

£135/13/11, the total expenditure £93/8/8, and cash in hand and bank £42/5/3. The one hundredth food parcel has also been despatched to the Secretary of the R.S.G.B.

Zone Organisers are as follows:—3YY, North Eastern; 3QC, South Western; 3QZ, Eastern; Kevin Duff, Central Western.

Please send your donations, made payable to the "W.I.A. Food for Britain Patriotic Fund" to your Zone Organiser or to VK3UM, the Appeal Secretary.

All Victorian Amateurs are referred to the August issue of "Amateur Radio" for details of raffles, etc. Tune to the weekly broadcast from 3WI for further news of the Appeal.

TECHNICAL ADVISORY COMMITTEE

Executive.—At the last meeting nominations were received for office-bearers for the forthcoming year for submission to Council. Victorian Council have approved the following appointments for 1947-48:—

Chairman, Mr. G. Glover (3AG); Vice-Chairman, Mr. C. Quin (3WQ); Secretary, Mr. W. Mitchell (3UM); Asst. Secretary, Mr. D. Gray (3ADG); Technical Editor, Mr. K. Ridgway (3CR); Council Representative, Mr. D. Gray (3ADG).

The Committee have laid down a programme of operation for the forthcoming year including the formation of a new Group, and details of T.A.C. policy will be given in later issues of the Magazine.

Modulation Technique Group.—It was decided to form a new Group this year which will deal with modulation, including the technique of the recently-released f.m. and pulse transmissions. Anyone interested in this Group should contact the T.A.C. Secretary, VK3UM. The meeting night has yet to be finalised, but would tentatively be the third Wednesday in the month.

V.H.F. Group.—At the last meeting of this Group, the problems associated with V.H.F. antenna design and operation were discussed by 3NB and 3XA. 3NB dealt with stub-fed and 3XA with folded dipole feeds for antennas. The next meeting will discuss V.H.F. transmitters and everyone interested is cordially invited to attend, bringing along their own rigs, if portable. Meeting night is the first Wednesday.

Receiver Group.—A very instructive demonstration with the c.r.o. attached to the i.f. stages of a receiver was given at the last meeting of this Group. Observations were made of 7 Mc. phone signals illustrating overmodulation and splutter. Its value was shown, as several stations who claimed clean modulation, were seen to be either overmodulating or to have a bad splutter present on their signals. Meeting night is the fourth Wednesday.

Bush Fire Emergency.—A confer-

on the 14th August, at which representatives from various Government Departments and the W.I.A. were present, did much to clear the air for future developments in this field. The conference was high in praise of the work done by the Amateur, and approved of the suggested W.I.A. plan of action. Crystals are now being distributed to base stations of the Network.

Frequency Measuring Service.—The T.A.C. are interested to know what the general feeling is regarding the use of phone as well as c.w. for these transmissions. Let the operator at 3WI know how you feel about this idea.

NORTH EASTERN ZONE MEET AT SHEPPARTON

July, 1947, was the month we North Eastern Zone Amateurs decided to hold a Convention at Shepparton and endeavour to justify our present and future existence as members of the Amateur Fraternity.

The date—27th—was pleasant in its anticipation, and apart from the rather cold wind and the downpour of rain from 1800 hours onwards, Nature was with us all the way.

The boys began reporting at the Star Theatre Supper Room from 0930 hours and by 1000 hours we were ready to commence with the meeting to inaugurate activity in the North Eastern Zone.

Comfortably seated around a blazing log fire, we had present VKs 3ABG, 3APB, 3ASG, 3AT, 3CN, 3DW, 3GD, 3HP, 3JK, 3KR, 3SN, 3TM, 3TS, 3UI, 3WZ, 3XZ, 3YV, also Les Archibald (senior technician 3UZ), and Associate Members Les Taylor and Ron Anderson. Apologies were received from 3ACW, 3BP and 3DG who, although absent, were not forgotten (hope to see you next time chaps).

Howard Wohlers (VK3YV) was unanimously elected President with Ken Rankin (VK3KR), Secretary and Treasurer.

Business completed and meeting declared closed, we moved about two miles out of town for a demonstration of 50 Mc. gear by 3UI and 3ABG. Situated one and a half miles apart with lots of gum trees in between, 36/7 signals were received by 3UI after 3ABG had placed his antenna vertical to coincide with that used by 3UI. Prior to the change, the horizontal position of antenna at 3ABG's end was not satisfactory. 3UI's signals were received S9.

Brief description of gear used follows:—3ABG, Tx: 1K5 co., 1K5, 6SN7, 807 plate modulated with 1A6 and 6V6. Rx: 6AC7, ECH35 into F86 at 5 Mc. Antenna: half wave doublet. Power input: one watt from vibrator. 3UI, Tx: 8370 crystal, 6G6 plate grid osc. tripler, 12A8s doubler, 832 final. Input 12 to 15 watts. Mod.: 6SS7, pair 12A6s plate modulation. Power supply: 12 volt battery and type 19

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generator. Rx: 9003 r.f., 9003 mixer, 9002 osc. with 3 if. stages on 10 Mc. Antenna: quarter wave vertical.

Further interest centered around Type A Mark 3 equipment brought along by 3XZ and 3ASG, and although no contacts were made on 7 Mc. in the limited time on the programme for demonstrations, the only distractions were caused by "camera-men."

A six miles run to Congupna and inspection of 3SR under the capable direction of Chief Engineer Pat Bennett. (3APB), proved a very acceptable diversion from Ham Radio. The highlight of the day, the "one item up our sleeves," was the visit to the (QRP?) station Radio Australia. To call it an eye-opener is being just plain reticent, words fail to express just how "goggle-eyed" the gang became on entering the door of this outstanding achievement in radio.

Six amps. in plate circuit of one transmitter (50 KW) was one thing, but twelve and a half amps. in the plate circuit of another transmitter (100 KW) was just too much for any dyed-in-the-wool Ham.. An introduction to 20 kilowatts of audio left us spellbound. Maybe some of you fellows would like to see it? You're welcome. The many directive antenna systems suspended from steel masts 210 feet in height did nothing to alleviate our amazement. The push button change-over of these antennas was just a dream.

Fluorescent lighting and air-conditioning throughout the transmitter building were just insignificant accessories. Capably piloted throughout the maze of equipment both above and below ground level, and for the splendid commentary, our thanks go to Bert Buck (3TM) and Dud Bell (3SN)—both senior technicians in this north eastern masterpiece.

Time and tide wait for no man and the lads were looking homewards, rain threatened, so with sincere handshakes, "cheerios," "till we meet again," the party broke—so did the storm!

Ever known a Ham gathering without incident? 3KR lost a fan belt and realised his radiator was empty on his way over in the morning, but 3TS found his radiator dry inside on his return journey some miles from Shepparton, and the rain just pelting down.

Thanks are extended to all members for their splendid co-operation in making Convention Number One an outstanding success for Amateur Radio in general and North Eastern Zone in particular.

WESTERN ZONE CONVENTION AT STAWELL

The Convention was held on 10th August at the Wimmera Cafe, Stawell. Those present being VK5 3AGB, 3TA, 3ATR, 3DP, 3AX, 3AKP, 3AKW, 3FJ, 3SA, 3YW, 3GN, 3HL, Ray Jenks, Charlie Richardson, Kevin Duff, and Eric Hardinge.

The meeting opened with 3TA in the chair and after a short explanation of the purpose of the meeting by 3TA, the election of officers for the new Western Zone was proceeded with. Office-Bearers elected were: President, Mr. George Turner (3GN), Ararat; Vice-President, Mr. Trevor Rodda (3ATR), Warracknabeal; Secretary-Treasurer, Mr. Cecil Waring (3YW), Stawell; Committee Members, Mr. E. Perkin (VK3EP), Bendigo; Mr. W. Holland (3XC), Maryborough; Mr. H. Peters (3AKP), Stawell.

Zone membership fee was fixed at 2/6 per annum to cover incidental costs in running the Zone.

3TA spoke on behalf of the Amateur Food Appeal for G Hams and Mr. Kevin Duff was appointed Zone Organiser (Kevin, by the way, is just waiting for his call sign).

Long discussion centered round a motion forwarded from the N.E. Zone to the effect that Zone membership fees should be subtracted from the W.I.A. annual subscription, but in view of the technical services provided by the W.I.A., and possibly not even dreamt of by country Hams it was unanimously agreed not to take any action in the matter.

Emergency network matters were discussed, but this matter was left over until further information was forthcoming from the Melbourne conference.

The matter of further Conventions was left in the hands of the Committee to arrange two Conventions

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per year, possibly to co-incide with field days of other Zones.

After the business meeting, a very enjoyable and instructive afternoon was spent in viewing 16 mm. talkie films, kindly made available by 3KN, on the subject of f.m., all present voted the film the clearest and easiest understood explanation of f.m. ever put before them and expressed their appreciation of 3KN's generosity in making the film and the talkie projector available.

At the conclusion of the f.m. film, Mr. Eric Hardinge produced some

absolute gems in the way of 16 mm. color films, these consisted of shots of the Grampians, and some marvellous works on flowers. They were quite the best color films seen to date, and Eric's interest in coming along and showing these reels to the gang earned our warmest thanks, although his efforts as a poet were to be unusual.

After the films the meeting adjourned to the dinner tables where an excellent repast was enjoyed by all those present. 3AX unfortunately could not stay for the dinner as he had to be back on shift at 3LK, but it was good to see Harold back with the gang again after all these years.

An animated discussion took place at the tables as to the oldest Ham present; 3HL winning easily with a starting date of 1924. Allan remarked you only had to count the hairs in his head to see the oldest stuck out.

The important subject of Zone hook-ups was considered, and it was decided to run it on the second Sunday of each month on 7050 Kc. at 10 a.m. It was suggested that other Zones might consider the idea of a spot frequency with the idea of cutting QRM.

The Convention ended about 1820 hours with a mass raid on 3AKP's shack, where a hectic discussion waxed and waned as to the merits of Keith's receiver.

Western Zone Members! Two important things to remember. (1) The Zone Hook-up 10 a.m. second Sunday in month on 7050 Kc. (2) Would those members of the Zone not present at the Convention please send their membership fee to C. C. Waring (VK3YW), 12 Skene St., Stawell

Personalities

3GN at present time having a good time with a Type 3 Mark 2, getting such good results on 3.5 and 7 Mc. phone that the big rig is in the dust bin. Ask George how to make yourself heard on 3.5 phone. —— 3TA still putting out clean phone on 7 Mc., can even be heard on 3.5 Mc. on rare occasions. Byron is a triode addict. If you want to hear some 150% modulation just ask him "why not use a beam tube." —— 3DP a busy guy on 7 Mc. c.w., puts out a good signal and raises his share, like me thinks 7 Mc. is a crook band at night and has his eye on 14 Mc. —— 3AX, good old Harold, 14 years' break and he still comes back. —— 3AKP works some amazing DX on 7 Mc. with a horizontal 14 Mc. zep. Has now moved to a new QTH and has a 7 Mc. zep so we shall see.

3AKW between running the farm and busting up tubes at 3LK, Bill puts out a good cathode modulated signal on 7 Mc. —— 3HL also up to his eyes in farm and has a peak at the DX on 14 Mc. with two nice long V beams. Has been on 7 Mc. c.w. lately. —— 3YW at long last

has two masts up, pushed the 60 footer up about six weeks ago (plus assistance from 3AKP, etc.). Very f.b. on 3.5 and 7 Mc., however the old 14 Mc. vertical is still the goods on 14 and 28 Mc. —— Kevin Duff will soon be giving 3GN a run for his money in Ararat, threatens to put t.c.c. on the plates if George takes up too much room. —— 3FJ and 3SA are both at present living in Melbourne, however it was good to see them again and Charlie certainly puts out a nice phone on 7 Mc. —— 3EP puts out a very nice signal on 3.5 Mc. phone, 12 watts and a P.M.G. mike, a good show Ted. —— 3XC, well Willy (or is it Clive) will have to explain why he did not get to Stawell. (We heard all about it on 7 Mc.—Ed.)

Western Zone notes secretary is the unfortunate 3YW, so let's have all the news boys in time to catch the Magazine on the 15th of each month.

QUEENSLAND

Secretary: R. Thorley, VK4RT, Box 638J, G.P.O., Brisbane.

Meeting Place: State Service Building, Elizabeth Street, City.

Meeting Night: Last Friday in each month.

The City-Country Contest held by the VK4 Division on the 3rd August was a notable success, if one may form an opinion on views heard aired on the Ham bands. At the time of writing VK4ER seems to be a comfortable winner, but all logs are not yet in.

What with the Royal National Show and everything, your scribe has very little news this month, but as the result of a change in employment, hopes to be a more or less permanent resident of Brisbane now, and as a result should be more in touch with developments than hitherto.

Speaking of the R.N. Show it has been suggested that the W.I.A. run a stall at future exhibitions. The matter will be considered by Council, and if the scheme can be managed it will receive consideration for next year.

Reports on VK4WI's reception continue to flow in, several being received of late from New Guinea. The use of dual frequencies (7 and 14 Mc. bands) has made a material contribution to the effectiveness of the coverage over the State.

Observed Arthur Johnson (4PX) doing a good job at the ABC exhibit at the R.N. Show, likewise 4LT was also putting over a good line of sales talk for his firm.

Eric Lake (4EL) now has 130 countries up his sleeve. 4PR has become a temporary resident of Guam, with the U.S. Forces, while 4VR, late a PK, is once again in Brisbane.

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SOUTH AUSTRALIA

Secretary: E. A. Barbier, VK5MD,
Box 1234 K, G.P.O., Adelaide.
Meeting Place: 17 Waymouth Street,
Adelaide.
Meeting Night: Second Tuesday of
each month.

A fellow Ham told me this month that he was a full "wake up" to these W.I.A. Council chaps who were able to get disposal gear whenever they wanted it. In fact he told me that every Council member had at least one receiver and transmitter in his shack that had mysteriously arrived from disposals in Melbourne. This intrigued me and I immediately dashed off home to find my new receiver and transmitter which would be sent airmail from disposals. I was very disappointed as no disposal radio had arrived for me. I thought all this over and decided that my fellow Council members were holding out on me. I determined to keep my eyes open when I visited their shacks and when I discovered these mysterious disposal radios I would give them a piece of my mind. I am still keeping my eyes and ears open but so far I have not discovered anything. Should any of you chaps reading this discover any clues would you please contact me and blow down my ear, because so far all I have received from being a Council member is a lot of hard work and plenty of abuse, and I would so love a disposal re-

ceiver and transmitter all for myself, like other Council members.

You remember the Broken Hill Boys' Club and the fact that the VK5 Division had sent a two guinea donation to help them on their way with their radio section? Well, we received a very appreciative letter of thanks from the Rev. Guthberlet who is the Superintendent of the Club. This Club is doing a real job among the youth of Broken Hill, and one of the few Clubs in Australia carrying a course in radio which is available free to any youth interested. What about it Divisional Council Members? Your Division won't miss two guineas and it will help to keep Amateur Radio alive among the up and coming youth.

The general opinion among Hams in VK5 regarding the abolition of the probationary period for newcomers was that it is a retrograde step, but the newcomers were overjoyed and celebrated the abolition in no uncertain manner by coming on the air with phone in record time. One embryo Amateur said he did not think he would worry about the code part of the examination as it would be wiped out before long anyway, which would be all to the good as it was an old fashioned method of communication!

Several non-members of the W.I.A. cannot see any advantages in joining the Institute but the same non-members are not averse to using the frequency measuring facilities and

the post office box number for their QSL cards plus any other tit-bits available.

The "William Tell" antenna ("bow and arrow" to you) seems to be gaining in popularity in VK5. Quite a number of these installations can be seen around the suburbs, although I would not be "game" to put an apple on my head and let some of them have a shot at it!

The standing joke "that one does not have to be silly to be an Amateur, but it helps a lot," wears a bit thin when the people who say it the loudest are the first to ask the Ham to have a look at their broadcast receiver because "it is not as loud as it used to be, you know."

Radio in VK5 this month seems to be in the doldrums as very little activity has been apparent on any band. The wet and wintry weather probably has had a lot to do with it as the fire certainly has looked very inviting these nights. Methinks the first flush of enthusiasm of being on the air is fading, and everybody is finding their level again. This is all to the good as there is more in Amateur Radio than "Hello CQ. Hello CQ."

Realising that the prevalent QRM is at its height during week-ends on all bands, many Amateurs are spending their time in making adjustments and testing during these periods, thus unwittingly adding to the QRM. The answer is, of course, the dummy

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aerial, and it is surprising how few are in use for testing, etc.

It was quite pleasant to see "Tommy" (51T) at the meetings again although he did look like a fish out of water down among the members. Somehow or other he always looks out of place anywhere but in the "chair." Whilst on that subject Hal Austin (5AW) is doing a swell job in the chair, and believe me, with the attendance lately it is a mansized job.

The monthly general meeting for August took the form of an entertainment evening and over 100 members and visitors were given an opportunity to hear the BBC transcription titled "The Story of Radar." Most members attended with somewhat mixed feelings, as expecting a gathering of Amateurs to sit still without talking for an hour and a half was asking something from a BEC transcription. The members not only sat still, but at the conclusion of the disc they applauded to a man what was undoubtedly the finest one and a half hours lecture that has ever been delivered to the W.I.A. Mr. Colin Ferguson moved a vote of thanks to Mr. F. Wreford (5DW), the ABC and the P.M.G.'s Department to whom the success of the evening was due. Visitors present included Miss P. M. Hubbard (an ex-W.A.A.F.) who is keenly interested in Amateur Radio and desirous of honorary membership, Messrs. Leonard (5LT) Cunningham (30V), W. Bland (representing the I.R.E.), Miller, Marshall (N.S.W.), Francis and Shultz. Apologies were received from CHIT Mouli (5CX), I. Thomas (5IT) and Jack Lester (5LR).

The opportunity was also taken to present to Mr. Reg Galle (5QR) the I.R.E. trophy for his outstanding work on the V.H.F. bands. Mr. W. Bland (I.R.E.) made the presentation on behalf of the donors (The Institute of Radio Engineers), and Reg suitably replied, giving as the reason for his success the fact that he was just lucky to have been around at the time. Modestly put Reg, and you almost convinced me you were only waiting for a bus at the time! Anyway sincere congratulations from all members for a job well done.

It was announced at the meeting that a letter had been received from Johnny East in Singapore thanking the S.A. Division for the favours and kindness shown to him during his short stay in VK5 as a member of the H.M.S. "Glory."

It was also announced that Regulation 38 of the Wireless Regulations is very definite about the transmission of any matter that can be conveyed over or by any of the communication systems provided by the P.M.G.'s Department. In view of this the Council is obliged to abandon any further investigations of recording apparatus for the purpose of re-broadcasting lectures, etc., over SWL for the benefit of country members.

The YL visitor at the meeting modestly sat at the rear of the room and it was not until the President, Hal Austin (5AW) announced Miss Hubbard that the gang knew of her existence. Most of them nearly fell over backwards trying to see the YL, and there was quite an uproar for a few minutes. After seeing the look on some of the "wolves" faces toward the front rows, I can now understand why Miss Hubbard sat at the back of the hall. Just in passing fellows, my talk with her was purely for the purposes of this magazine, after all I am the correspondent. Woo! Woo!

The practice of having visitors rise to their feet at the meetings to be introduced to members is creating favourable reaction, but apparently some of the visitors have guilty consciences or something judging by the look on their faces. Of course we could ask "Doc" to retire during this portion of the proceedings! Talking of "Doc" (5MD) there is no truth in the rumour that he had occasion to speak crossly to one of his "boarders" for doing a little overtime work with an hacksaw because the noise spoilt reception on 28 Mc.

The local commercial broadcasting stations' change of close-down hours from midnight back to 11.15 p.m. each night was greeted with whoops of delight from the BCL interference chappies, who may now come on phone or c.w. three quarters of an hour earlier. What about the ABC you say, well a little BCL interference would probably create a wider listening public.

The attendance at the monthly meeting was a little below average, due probably to the rain and cold. Old-time members will smile at this, remembering the time when 25 was a good attendance. Why we know the attendance was a little down is because only one or two members were sitting on the floor!

WESTERN AUSTRALIA

Hon. Secretary: W. E. Coxon, VK6AG, Howard St., Perth, W.A. Meeting Place: Builders' Exchange, St. George's Terrace, Perth. Meeting Night: Second Monday in each month.

The July meeting held on the 14th was well attended, those present being—6WH, 6RB, 6MY, 6LM, 6FW, 6AS, 6WT, 6RS, 6DN, 6CP, 6YZ, 6SD, 6RG, 6DF, 6BK, 6HL, 6WS, 6EV, 6DD, 6KW, 6SA, 6HT, 6MB, 6FL, 6DJ, 6GA, 6GB, 6PW, 6RU, 6OR, 6FR, 6AG, 6LS, 6TB, 6NL, 6GM.

A very interesting evening was held, during which 6HL showed an American made f.m. transmitter. As f.m. is in the "air" these days, this transmitter created quite an interest.

6RU demonstrated the use of the Class C Wavemeter and the correct procedure to adopt when calibrating it against known standards. 6SA showed an interesting a.c. power pack

that fitted in place of the vibrator pack for the same wavemeter. 6AG topped the evening with a demonstration of how to erect a 80 foot high, 1" diameter, water pipe mast. To assist in the explanation, Wally used a scale model approximately 8 feet long. This model proved the points stressed and all the VK6 gang present went home much the wiser for their evening spent at the W.I.A. meeting.

The August meeting was held on the 11th, and the attendance swelled to almost room capacity. Those

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present were 6WH, 6HL, 6LW, 6DF, 6RU, 6DJ, 6WS, 6LS, 6EV, 6RF, 6TX, 6KW, 6SA, 6NL, 6DD, 6MB, 6GJ, 6JH, 6RJ, 6FR, 6CP, 6FW, 6YZ, 6AS, 6GA, 6RS, 6DN, 6FC, 6CM, 6CC, 6OR, 6PW, 6BG, 6KE, 6LM, 6JN, 6AG, 6GM and W6DJP. After a short business session reports were received.

6WH, Country Liaison Officer, reported a new country Radio Club being formed in Geraldton with 20 members. Encouragement for training A.O.C.P. candidates is being practically demonstrated by this Division by a donation of a suitably inscribed meter to the Club. This meter is to be held by the Club and presented at the end of the first A.O.C.P. class, to the best student.

6RU, QSL Officer, reported good business in QSLs and thanked 6MB for donating a new metal QSL box to the Division. 6EV reported on the function of the Disposals and Exchange Bureau. Valuable help to the members in purchasing gear has been obtained via 6EV since the inception of this section.

The rest of the evening was spent by listening to an interesting discourse by 6JH (J. Horne) on his travels as a wireless operator on a ship during wartime. Various chuckles and laughter were heard during this very interesting and at times humorous talk. 6RU rounded off the evening with a demonstration of his new double conversion band-switched superhet. Everyone went home again feeling that an evening had been well spent.

LOG SHEETS

The new Log Sheets printed locally for this Division, along the lines of the A.R.R.L. Log Book, are available to members. These sheets, together with binders, are the answer to our Log Book problems. Sheets are available at 2/6 per 100 and binders 1/10 each.

With a combination of these, a complete Log Book for any period (example 1 year's operation) can be bound in a few minutes and will last indefinitely. Supplies are obtainable from the Secretary: 6AG, 7 Howard Street, Perth.

PERSONALITIES

6DD has been busy building a new v.f.o. around his Bendix Wavemeter.

John reckons to be on the air again shortly. —— 6JS is busy building his new shack. Slow, but sure, is Jack's motto. —— 6MW is not so active these days. The weather too cold Bill? We guess a fire is nicer these nights. —— 6WT is keeping 7 Mc. warm with a f.b. phone signal. Congratulations Dave. —— 6NL busy designing a new super blooped receiver. Vic is seen daily pondering over plans and weighing the 4-gang condenser he proposes to use. —— 6GM is not heard much these days. We have reason to suspect he is cooking up some new contraption. —— 6LW, the first VK6 to go f.m. Yes Wally was up to the early hours when word came through that f.m. was a reality and was on the air next morning with it.

6KW prefers the fire also these cold nights, and is not heard so frequently. —— 6RU is back on again after a few weeks' retirement during building of his new super de luxe receiver. —— 6BW is paying W.A. a visit again at last. That's how it seems to us. Mick seems to be away from VK6 more than in it these days. —— 6RO still a "left at the post" Ham. Bert still listens and plays with the super bloop. —— 6AW; a call well known to pre-war Hams. Andy Watkins is no longer the owner as he is in Cairns with Civil Aeradio. Sends his best regards to VK8 via VK6AX.

6TX is still a SWL and doesn't seem to be making the promised progress to put Mosman Park on the air. What about it Jack? —— 6CM has been

DISPOSALS GEAR RE-VAMPED

It may be of interest to "522" owners to hear of what 4HR has done with his. Tibby has retained both tuning condensers and has added a separate oscillator unit covering the range from 60-80 Mc. The gang condensers are used to tune 50 and 166 Mc. input r.f. and mixer channels with the second harmonic of the oscillator used for injection on 166 Mc. The oscillator, which fits in the space formerly occupied by the 12A9/7 harmonic amplifier is a 6K7 electron coupled, with coupling to the mixer channels via a link through a condenser from the 6K7 plate. The result is a nifty dual band receiver with a choice of input from either band to the 12 Mc. i.f. channel.

on 7 Mc. lately with a much more fully modulated signal. Keep it up Bill. —— 6MU very quiet these days. We haven't heard from Merredin lately. What's the news up there Mal. How about some notes for "A.R."? —— VK3KU has promised VK6 another visit in early September. It's a case of the "wildflowers that bloom in the spring" and Howard hopes to see them in full bloom. Of course that's not all he's coming over for, is it Howard?

PUBLIC SERVICE VACANCIES.

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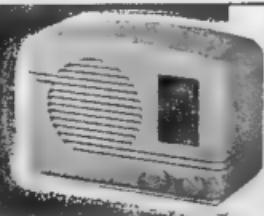
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Phone W 1328.
Meeting Place: Photographic Society's Rooms, 163 Liverpool Street, Hobart.
Meeting Night: First Wednesday of each month.

It may have been the firewood famine and the promise of 7CW's radiators, but the weather had no apparent effect on attendance at the last general meeting.

Proceedings opened with the announcement of, and much conjecture on, the imminent issue of new regulations, in the interpretation of which Tasmanians should soon have access to the "good oil." Peter Dunne, who fathered the first lusty but somewhat ambiguous infant is, we understand, to be the new Radio Inspector in these parts.

Particulars were given of a recent tour of three or four shacks by Mr. Duthie, M.H.R., who indulged in a QSO at 7CW and morning tea at 7LJ, thereby learning something of Ham Radio AND morning tea at their best. While on the subject of publicity, TNC made some timely remarks on the need for press articles which give a true picture of our activities. A prepared release by the Institute would be less misleading to the public than some of the strange results of journalistic imagination we have all seen at one time or another.

The Secretary of the Tasmanian Division of the I.R.E., who is one of our members, suggested that as a local arrangement, the W.I.A. would be welcome to attend I.R.E. lectures in order to avoid duplication of material which is of interest to both Institutes. This met with immediate approval, and a reciprocal invitation was issued to I.R.E. members for such occasions as would be of interest to them.

Arising out of this, it was decided to re-open the question of affiliation with the Tasmanian Association of Scientific Societies, and 7LL was appointed to act as our delegate at their next annual general meeting.

7LL then put in a word on behalf of the Red Cross blood bank, at which he performs the rites, and was rewarded later by the appearance of several recruits.

Following the passing round of the Food-for-Britain hat, which netted something over five pounds, some films lent by the Education Department occupied the rest of the evening in place of the usual lecture.

Three of our Associate Members, Bob Fulton, Ted Cruise and L. Edington, have received good news about the A.O.C.P. and are now preparing to add transmitters to their modulators—well, anyway they are getting ready to go on the air.

Someone who fell into the same error heard 7OM and 7CW getting all set recently for the VK7 fortnightly

ragchew—right time, right night, but the wrong week!

7YY wonders if there is a prize for the worst location. Every time he hangs out an extra foot of wire the hydro people promptly box it around with power lines, presumably to get their ergs back and sell them to someone else. And if the proposed V.H.F. converter goes up on a patient XYL's kitchen cabinet to join the Kingsley and 80 watt rig, it might well prove to be the straw that breaks the camel's back.

7KA (Syd Dahl, ex-4KA) has acquired a Type 3 Mark 2, a handy little job for his trips around in Big Bertha. He uses this vehicle to iron the humps out of Tassie in order to survey the place.

Lengthening daylight hours are bringing an improvement in DX conditions, and one also begins to think once more of field-days which, while not claiming to make profound contributions to science, are still among the best things we've seen in the way of healthy social functions.

NORTHERN ZONE

There has been very little activity in this Zone since last month's notes were written. Most of our members have either been revamping existing rigs or building new gear.

7RK has spent considerable time perfecting a key click filter and tests have proved that the time was not wasted. Has also been having quite a lot of fun experimenting with antennas. Ray is now on phone once more. —— 7DS is still having trouble with his rig and complains that he has insufficient time to chase the bugs out. —— 7BQ is busy getting on to 50 Mc. in a big way. The transmitter is completed and working well, and a three element beam is now being constructed, trouble however is being experienced with the converter. Len has just returned home after a week in Melbourne.

7LZ is still active on 14 and 28 Mc. Has now increased the height of his three element rotary beam to fourteen feet. The W8JK has now been discarded. Although 7LZ got his existing rig working on 50 Mc., it did not prove satisfactory and a separate transmitter is now being built. —— Conditions in the North have been very poor for the last couple of months, however 14 Mc. is now more consistent and on 28 Mc. an occasional South American can now be heard. The South Africans are also proving good contacts after 4 p.m. —— George Elliott (G5LJ) advises that Ron Hope is sailing from England on the 29th of August. George also wishes to be remembered to 7CW, 7LJ and 7YL. —— Nothing has been heard of the coast gang, however stations have been heard calling 7XL and 7JT. We hope to be arranging skeds with 7AB and 7XL on 50 Mc. soon.

CARE OF INDICATING METERS

Handling.—The movement of an electrical indicating instrument is supported between steel pivots whose points have a radius of about 0.001". These pivots bear on polished jewel bearings. In order to avoid damage to the movement it is important to avoid rough handling, so—

(1) Carry instruments carefully and hold them by carrying handles, if provided.

(2) When placing a meter on a bench cultivate the habit of easing it down with your finger tips, and so avoid the possibility of unnecessary bumps.

Cleanliness.—The moving parts of a sensitive electrical instrument work with fine clearances; to ensure reliable operation the instrument should be kept clean. So—

(1) If your multi-meter is provided with a carrying case, return it to the case and close the lid when instrument is not in use.

(2) If it is necessary to open the case enclosing the indicating mechanism cleanliness is very important. A layer of dust will soon settle on those fine air gaps, and sticky operation will result. Be especially careful to keep away from iron filings when opening the case of a moving coil instrument, as these will be attracted by the magnet and will stand on end in the air gaps, completely blocking the motion of movement.

Accuracy.—When it is necessary to get that last bit of accuracy for a particularly critical measurement, here are some of the points you should keep in mind:—

(1) Portable instruments are usually calibrated laying flat on a horizontal bench. Due to the effect of a small amount of unbalance of the movement, tilting the instrument will introduce small errors into the indication, even if the pointer is adjusted to zero by the zero adjuster.

(2) Moving coil instruments are affected by masses of magnetic material in their immediate proximity. The sensitivity of a flush panel type instrument is reduced 3 to 5% when mounted in a close fitting steel panel. Don't put a portable instrument on a steel bench or on other equipment mounted in steel cases. Avoid placing meters together under working conditions, as the magnetic fields can interact with each other and cause inaccurate readings.

(3) The rated accuracy of an indicating meter is usually expressed as a percentage of the full scale reading. Therefore the maximum possible percentage error in a given reading increases as the reading is reduced from the full scale value. Conversely, for maximum inaccuracy it is desirable as a general rule, that readings be taken as near to full scale as possible. One exception to this rule is to be observed when using the ohmmeter. With the common types of ohmmeter used for radio servicing

work, the reading of the ohmmeter is zero at one end of the scale and infinity at the other; for greatest accuracy readings should be taken at the CENTRE of the scale.

The above information was prepared by Duncan Gray (VK3ADG) who is leader of the "Laboratory and Calibration Group." If you have any special problems regarding instruments which you would like to see explained in "Amateur Radio," then drop a line to Duncan care of the Technical Advisory Committee of the W.I.A. (Victorian Division).

Optical Plastics to Revolutionise Television Receivers

Description of New System

Details of new plastic optical systems, which will revolutionise the design and performance of domestic television receivers, was described at a meeting of the Television Society in London on Thursday, 29th May.

The new systems, which have been evolved in the Optical Development Department of I.C.I. Plastics Division, at Welwyn, will render obsolete the present-day small curved screen, round which viewers are obliged to huddle in order to get an undistorted picture. In its place will be a large flat screen—approximately 16" by 13"—providing a well-lit picture of great clarity to a much larger audience.

The heart of the television receiver is, of course, the cathode ray tube. It is in television what the loud-speaker is in a sound system—the instrument by which the electrical impulses collected on the aerial are converted into something tangible.

With the design of television receiver at present in use, the viewing screen is, in fact, the curved end of the cathode ray tube. There are, however, definite limits to the size of the tube that can be employed and therefore to the size of the picture obtainable by this system. The type normally used is of 9" diameter, giving an image 7" on its end, but the provision of a large picture by this system would demand a cathode ray tube so big that its incorporation in a domestic set would be physically impossible. For example, a picture large enough for comfortable viewing would demand a cathode ray tube two feet in diameter and very much longer.

The obvious solution has been to develop an optical system with large light-gathering power, so as to make the utmost use of the already weak picture on the cathode ray tube. Such a system has been available for some time. Consisting of a concave mirror plus a corrector plate of complex shape with a non-spherical surface to ensure absolute accuracy, it had been used for some years in astronomical work. In the I.C.I. laboratories this has now been adapted to television projection, and the

factor which has hitherto prohibited its widespread use—the enormous cost of the lenses and mirrors when made in glass—has been completely overcome by the perfection of a rapid and cheap method of casting accurate lenses in transparent plastics, known as "Transep" I and II. The extreme accuracy demanded of a lens of this nature has been obtained by building up on their surfaces a skin of the same material until they constitute a perfect reproduction of the mould. This unique process, known as Surface Finishing, has paved the way to the widespread utilisation of such systems, and their mass production at a very moderate price for installing in domestic television receivers. Eventually, the bigger screen will not necessitate any increase in the price of receivers—if anything, the reverse. Moreover, the optical system is so compact that it will enable combined television and sound receivers to be produced in cabinets of quite moderate size.

The new plastic system reproduces pictures without any foreshortening or reflection of highlights in a room, which are ineradicable faults of the curved screen. Coloured pictures are reproduced with great fidelity.

Another interesting development is called a directional screen. This concentrates all light in the normal viewing area of the projected picture, enabling a large number of people in the normal living room to see it equally brightly, whatever their position with respect to the receiver. These screens, which are still in the experimental stage, are covered with tiny plastic lenses so minute that 40,000 are contained in the square inch.

Mass production of plastic optical systems by the Surface Finishing process will begin before the end of the year, and be in full swing by the middle of 1948. The necessary factory will be established in the London area.

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9d. per line, minimum 2/-

WANTED TO BUY.—QSTs for Sept., Oct., Nov. and Dec. 1940, and Jan. 1946—in good condition—fair price paid. VK3UM, W. Mitchell, 1946 Malvern Road, East Malvern, or ring MXV 440, Ext. 6635, during day.

WANTED TO BUY.—Good 4 or 5 tube a.c. or battery receiver, must cover 80, 40, 20 with 10 optional, will pay freight. Eric Treblecock, Box 12, Wynyard, Tasmania.

VK3SK wishes to dispose of quite a bit of transmitting gear, a tube checker, and communication receiver. Please telephone LF 7092 for information.

TYPE 807 AS A HIGH-MU TRIODE

Not Recommended, says A.W.V.

We were recently approached for an opinion on the performance of a type 807 as a high-mu triode with control grid and screen tied together. Tests carried out on a few valves gave the following results at a plate current of 25 Ma.:

Amplification factor 195

Mutual conductance 4,500 umhos

Plate resistance 43,000 ohms.

The plate current at zero bias was approximately as under:

	Plate Voltage	Plate Current
200 volts	1.9 Ma.
300	2.9
400	3.7
500	4.8
600	5.6
700	6.7

The tests at positive grid voltage were very disappointing, owing to the heavy grid current. It can therefore be taken that type 807 as a high-mu triode, is not suitable for use as a zero-bias Class B Amplifier. It may, possibly, find a limited application as a high-gain resistance coupled amplifier operating in the negative grid region.—Radiotronics No. 125.

Selection of Valves For Use As Cathode Followers

Not all types of valves are entirely satisfactory as cathode followers, or even with an unbypassed cathode bias-resistor. No trouble usually occurs with triodes, but care should be taken to see that a pentode should have the internal screen, if any, connected to some pin other than the cathode pin. It is important that the internal screen be effectively earthed and this cannot be done with a cathode follower if the screen is connected to the cathode inside the valve.

This is the case with types 6AG5 and 6AK5, so that neither of these types is desirable for use as a cathode follower. Types 6AU6 and 6BA6 are entirely satisfactory for use as cathode followers, since their internal screens are connected to the suppressor grid and not to the cathode. In this case the pin leading to the suppressor grid and internal shield should be returned to a point of approximately the same d.c. voltage as that of the cathode, but should be adequately bypassed to earth.

Radiotron types 6U7G and 6D6 differ from valves of the same type numbers by other manufacturers in that the internal screen is connected to pin number 5 (suppressor) as indicated on the A.W.V. data sheets. This is specially to permit the use of these valve types in certain equipment in which the cathode is not earthed.

Radio engineers are advised to pay careful attention to the connection of the valve internal screen in all cases in which the cathode is not effectively earthed.—Radiotronics, No. 124.



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